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Agriculture

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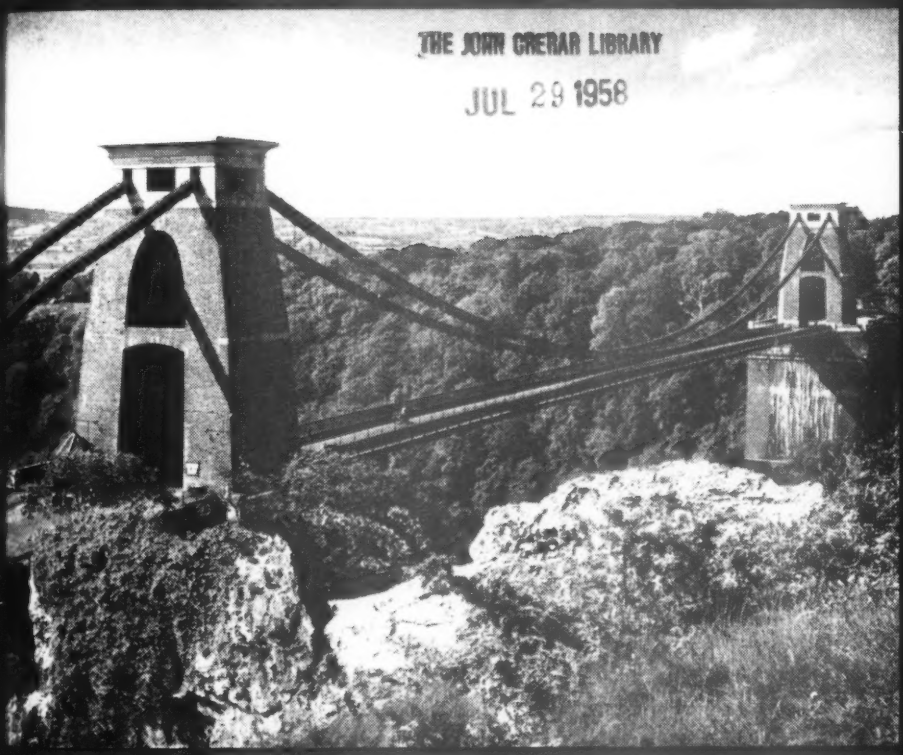

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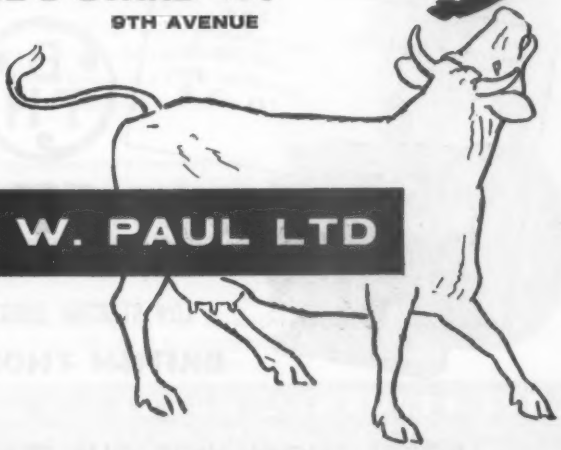

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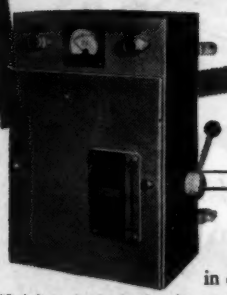

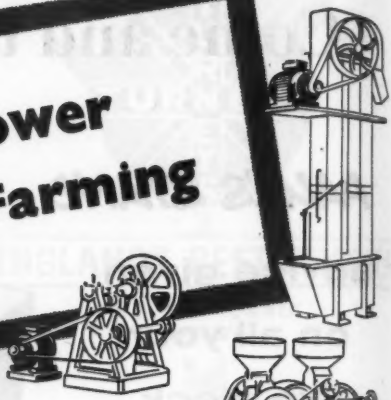

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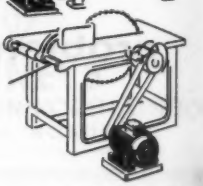

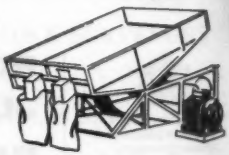

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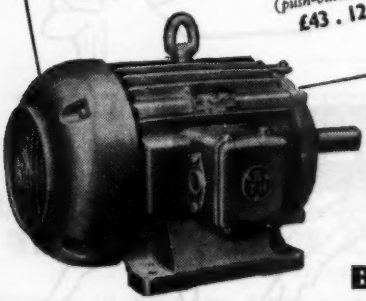

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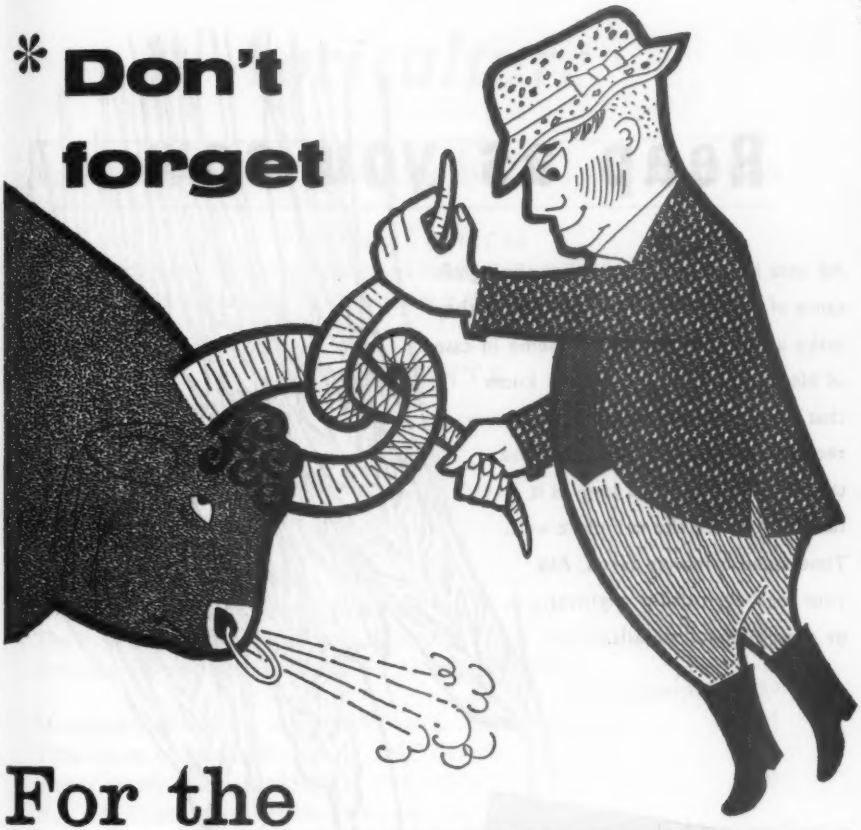

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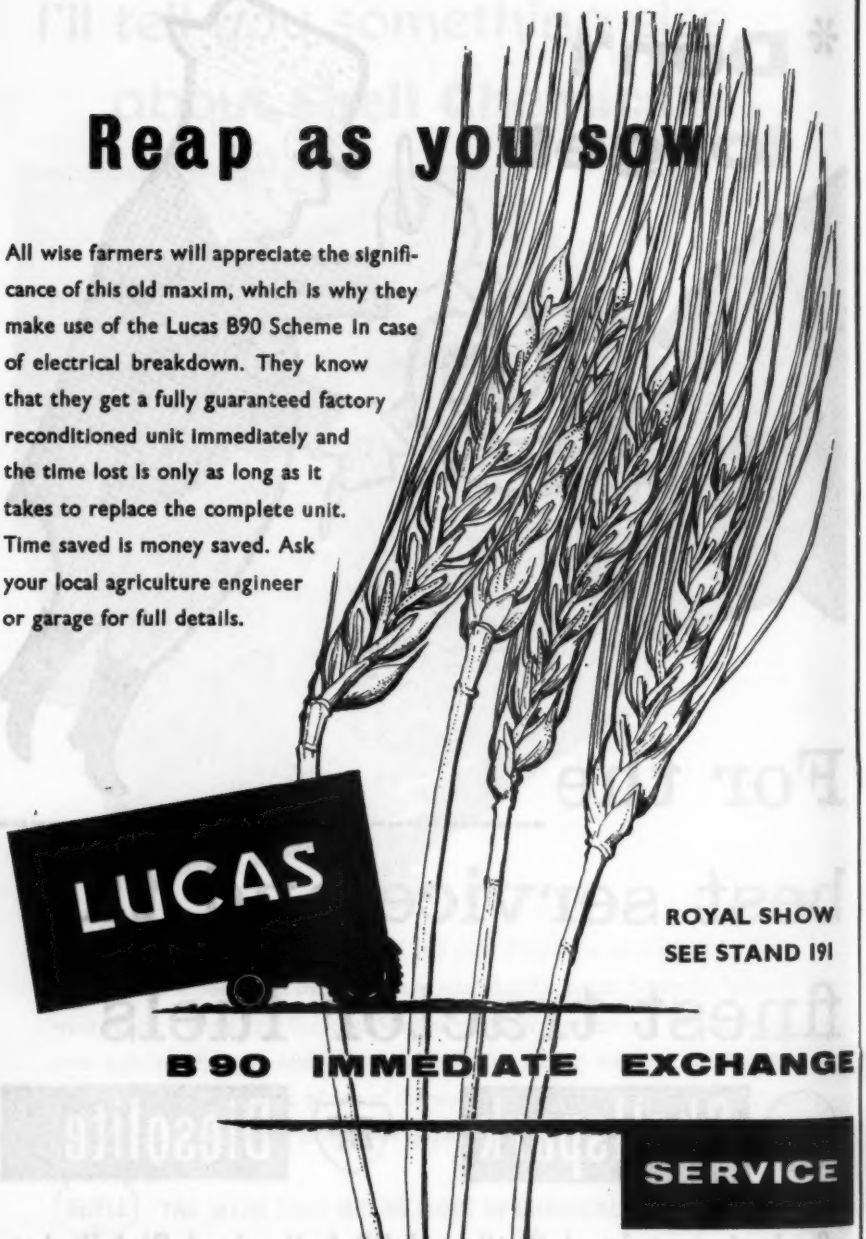

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Bristol

S. R. O'Hanlon, M.B.E.
Editor, Agriculture

High on the east side of Plynlimon, where rush and grass contend in age-old rivalry, the Severn rises to flow in a great curve to that ante-room of the Atlantic which geographers call the Bristol Channel. South and east, the lower Avon cleaves its peculiar course down the Cotswolds to flow leisurely by way of Malmesbury and Bath and the spectacular tree-clad gorge at Clifton to meet the Severn and the sea. To these two rivers and the man-made diversion of the Frome in the thirteenth century to serve the needs of her harbour, Bristol owes her economic eminence, her place as the capital of the West of England and the second greatest port in the kingdom. Janus-faced, she stood as the gateway to the agricultural wealth of an inland area stretching from Wales as far east as Buckinghamshire, and to the boundless commercial possibilities of sea-faring enterprise which her merchants and seamen were to explore and exploit to the full. By the fourteenth century, drawing upon the fleeces from sheep flocks of the Cotswolds, Gloucester, the Wye Valley and Somerset, Bristol had become one of the leading staple towns in the country.

Within her strong city walls, medieval burgesses, favoured by royal charter to be "quit of toll and passage" throughout England, Wales and Normandy, prospered as England's wool trade found lucrative markets along the seaboard of Europe. From the bustling quaysides of her city harbour, secure from marauders, the barques and brigs of the merchant venturers plied their trade in an ever-widening range of activity, wresting trade wherever their captains and crews could seize an opportunity and establish an English market. To the port came an increasing number of ships from Spain, Portugal, France, Ireland and Scandinavia, besides the smaller vessels of the Welsh and coastal trade. Wool spun and woven in the scattered villages and hamlets of the Cotswolds and Mendips was exchanged for wine in cask; broadcloth dyed and finished in the newly-acquired Temple area across the Avon was traded for fruit, Seville oil, white Castile soap, fish and woad. The coastal trade brought corn down the Severn from Gloucester and Worcester, tin from Cornwall, skins from Wales, and timber and iron from the Forest of Dean—raw materials to supply Bristol craftsmen and the growing export trade.

Out through the Avon Gorge sailed the ships of men like John Jay and Thomas Lloyd, Hakluyt and the Cabots who, fired by tavern talk and dreams of the fabulous East, searched for a western route to Cathay and defied storm and mutiny to bring the new lands of North America, Greenland and Labrador to the maps of Tudor England. Full many an adventure on the high seas—infamous and heroic alike, commingling romantic fiction and recorded fact—had its genesis in the port of Bristol to make, in Bristol-born Southey's words, "such wondrous tales as childhood loves to hear". It is not without significance that Jim Hawkins, Squire Trelawney and Dr. Livesey sailed thence in the *Hispaniola* for Treasure Island; the Llandoger Trow

Continued on p. 212

Farming in Gloucestershire

D. C. Barber, M.R.A.C.
County Advisory Officer, Gloucestershire

Gloucestershire is known chiefly for its Cotswold country, but it is in fact a county of wide contrasts. This article attempts to give a brief picture of the farming pattern and outlook in 1958.

Looked at agriculturally, the county of Gloucestershire can best be divided into three parts. In the east, and accounting for nearly half the total acreage, is the high solid mass of the Cotswold country, the thin inhospitable land of Cobbett's day now miraculously transformed into one of the more prosperous farming areas in Britain. In the centre are the low-lying and wooded clays of the Vale, sandwiched between the foothills of the Cotswold escarpment and the muddy waters of the River Severn. In the west, bounded by the borders of Wales and hemmed in by the rivers of Wye and Severn, the ancient Forest of Dean and the Red Sandstone area of Newent and Dymock, spilling over from Herefordshire. It is still a green and pleasant land, in spite of the activities of the armed services during the war and the worst that the new industrial revolution can do in the form of atomic power stations and the spectral stride of overhead cables.

For those who must have statistics and who have the mental ability to digest them, let it be said that Gloucestershire consists of 600,000 acres of farmland and some 30,000 acres of rough grazing. Its farm holdings number 8,500, from the single acre horticultural unit to the 1,000 acres of Cotswold empires. Last year, the tally of crops included 120,000 acres of cereals, 3,500 acres of potatoes and 12,000 acres of kale and other forage crops for livestock. Vegetables—an important industry in the county—were grown on some 6,000 acres. The county dairy herd is an appreciable one and now totals some 76,000 cows; last year cattle numbers climbed to a post-war peak of 200,000 head. The pig breeding herd follows national trends and is now 15,000, while sheep numbers, which have also been increasing significantly year by year, have topped 100,000.

The Cotswolds

Those who before the war motored down the central spine of the Fosseway, from Moreton-in-Marsh to Cirencester, Tetbury and beyond to the county boundary with Somerset and Wiltshire, saw a rather dejected agriculture. It had the appearance of being out of step with the times, of having been created to fit a pattern of farming which could no longer attain even a moderate prosperity. Corn farming was at a discount and a lack of water and fencing tended to impose a system of ranching which, in order to pay off, had to be run on the cheap. The dairy cow encouraged and sustained a rather higher standard of husbandry on many farms, but on the whole the picture was one of large areas of thin grass lightly stocked and, with the few patchy arable fields which came under the plough, seasonally yellow with charlock. It was also remarkable rabbit country.

The war, as we know to our cost, altered many things, but in farming

terms few areas show such fundamental changes as the Cotswold country. First came the necessity, as elsewhere, to plough, second the combined corn and fertilizer drill, and third a developing awareness of the principles of using leys to conserve fertility.

Today the pattern of farming is startlingly uniform and clear. Corn, short-term leys, some herbage seed, potatoes and an odd field of sugar beet; store cattle and sheep, more dairy cows than most people imagine and a wide scatter of pig and poultry units on the majority of farms. The economy of the area, of course, pivots almost wholly on cereals. Apart from the fact that most farmers have reasonable confidence in the long-term stability of corn prices, there is little doubt that barley can be produced on a cost of production basis against any other country in the world. Indeed, some of the larger farms have cut cereal costs to 14*s.*–15*s.* per cwt, and even lower in those favourable years when averages of over 30 cwt per acre have been obtained. Another fundamental factor is that leys will not normally stand after the third or fourth year, and the plough is clearly both managerially and technically the key to the situation.

In recent years, as elsewhere, the profitability of livestock and livestock products has deteriorated in comparison with cereals. As a result, there is a continuing interest in ways and means of increasing the cereal break in the rotation. The conventional rotation which developed after the war was, and is, a three-year ley (normally the blunderbuss type of mixture) followed by winter wheat and spring barley undersown to a one-year ley, which again is followed by two corn crops. This is a well-balanced cropping series approved by all who are concerned with plant and soil health. It is a rotation which has proved its worth. It is none the less true that on the larger acreages a cut in the ley break from one-half to three-sevenths, by reducing the long-term ley to two years, can have a significant effect on cash returns. It is also true that much of the evidence coming out from the research stations tends to support the view of those who believe that we may have paid too much respect to the restorative power of the cropping sequence. It must be recognized that our Cotswold country is intrinsically less valuable for corn production than the southern chalklands, and any fundamental changes must lie some way ahead after further careful trial and error. It is likely, however, that a rotation will eventually emerge of three years' corn and two years' ley.

Leys sown to maintain the fertility to grow the corn are largely utilized by sheep and store cattle produced under a variety of systems. Ewe flocks have increased significantly in size in the past decade, and there can be no doubt that fat lamb production has paid very much better than any form of beef enterprise. It is quite a job to gross very much more than £15 per acre devoted to beef, whereas sheep are currently showing outputs of anything up to 50 per cent above this figure. Latterly, there is a tendency for earlier lambing to catch the premiums, and on the beef front there has been a marked swing to single-suckling or its development of two and three calves running with a foster-mother.

Dairy herds follow no prescribed pattern. They are there on some of the smaller farms because of the need to maintain an appropriate turnover and on the larger holdings mainly because of personal preference on the part of the farmer. Their place, however, on the larger arable farm is occasionally suspect; farm management advisory work has revealed a tendency for dairy

herds in these circumstances to attract rather more of the farm's resources than is justified. And cows, as a relatively less important factor than corn and sheep, tend to show a rather lower efficiency as food converters. During the last two or three years, the advantages of the outdoor milking bail have been recognized, and it appears likely that the flexibility of this system will result in a wide swing over on those farms not particularly well equipped with cow buildings. Surprisingly, perhaps, some of the smaller Cotswold farms of around 200–300 acres are switching to a specialized type of milk production based on forage and self-feed silage. Present indications are that such systems show considerable advantages in terms of net income over the more conventional mixed farming patterns.

The Vale

The Vale consists in the main of a long rectangular area of land with the towns of Tewkesbury and Broadway at the northern corners and Bristol and Chipping Sodbury in the south. Although the prevailing soil type is lias clay, there is a wide variety from almost blow-away sand around Tewkesbury and Cheltenham to the most intractable and sour of heavy clays. Milk production is clearly the order of the day, and there are relatively few farms independent to any extent of the dairy cow. Many of the farms are wholly specialist without sheep, beef or arable, but there is a fair scattering of ewe flocks and beef stores. Pigs and poultry are general throughout the Vale farms and there is some arable cultivation where soil conditions permit. With milk production as the mainstay of the Vale economy, it is natural that the main preoccupation is a search, and a fairly desperate one in many cases, towards cost cutting, with 2*s*. per gallon as the magic target. The pressure of milk selling prices in the last few years has brought about some fundamental changes in policy, housing and management on most farms, and trends in certain directions (for example, loose housing) have had additional impetus from the farm improvement scheme in recent months. Milk policy is normally associated directly with size of farm. The smaller holdings, reliant on high yields per cow, have had a more difficult problem to face than those fortunate enough to have enough acres to allow some flexibility. The movement away from conventional cowsheds to loose housing and parlours continues to grow apace, as does the interest in the succession of new techniques, the latest of which is "bed and breakfast silage".

Many of these Vale dairy farmers with particular worries relating to milk production are looking around for alternative sources of farm income. On all but those few holdings which have particular advantages of flexibility, such as a high proportion of the acreage being suitable for direct cash crops, a switch away from milk must imply a further and reluctant dependence on pigs and poultry. Several of the farms of around one hundred acres have found some benefit from increasing the size of the herds, at the expense of other departments, to the point where there can be an appreciable saving in unit costs.

Forest of Dean and West Gloucestershire

This is an area which can be regarded almost as a world apart from the

Gloucestershire east of the Severn. The northern end is a highly developed arable area on the Red Sandstone, which tends to look towards the county of Hereford as being more closely akin than the home county; and further south, throughout the Forest, the influence of Wales is clearly apparent in speech, name and perhaps philosophy.

It is in fact an area of extraordinary contrast in farm size, soil type, size of holding and even rainfall, for a large part of this forest country is in a rain-shadow caused by the towering Welsh hills and mountains lying to the west.

The northern arable end is typical of the sandstone arable farming of Hereford and Salop. All the farms of any size rely for an appreciable part of their income on cereals and cash roots, and there is a long traditional pride in their arable cultivations. Sugar beet, potatoes and recently canning peas dovetail into the corn and herbage seed crops, and fat Herefords and Clun sheep dapple the landscape.

Coming south before the Forest proper is reached, there is a belt of heavier country, where wholly dairying farms preponderate, which at Westbury-on-Severn meets the long convoluted strip of riverside farms found all the way down from Tewkesbury to Chepstow. On the whole, these are grazing farms which have tended to go over to dairying. One of the problems common throughout almost the length of this strip is the distance between the farm buildings and much of the land, due to the former universal practice of summer grazing with beef cattle.

The Forest proper is perhaps of more interest to the antiquarian than the agriculturist. It is a remarkable block of old indigenous oak forest supporting a variety of local industries, including privately worked coal mines. The farming interest in the Forest is largely confined to a scatter of small holdings eking out a livelihood with outside interests. Not very many years ago an appreciable ewe stock of Welsh Mountain and Radnor type ewes ran the Forest grazing areas. The sheep were owned by those who possessed grazing rights, and since the war there has been an impressive improvement in the quality of the lambs coming forward to the autumn sales through the use of better class Suffolk rams.

Foot-and-mouth disease a few years ago struck a blow from which the sheep have not yet really recovered. Their numbers are now probably down to well under 3,000.

Some of the problems

Some interesting developments are beginning to take shape on a number of farms in the county where a positive approach to the present-day farming climate is being adopted. The expansionist philosophy engendered by the famine atmosphere of the early post-war years, and encouraged more recently because of the need to maintain income in the face of falling prices, is becoming increasingly suspect. The result of an agonizing reappraisal of individual farm systems is tending to show emphasis on specialization on the smaller farms and a streamlining on the arable farms of the hills. Quite a number of smaller farms have jettisoned some of the many irons which they had in the fire, and are now setting out to become really expert in a chosen branch. On the Cotswolds it is interesting to note that not only have some farmers expanded beyond the stage where they can maintain really

efficient managerial control, but there is a recognition of the fact that there is little point in achieving outputs of £45 per acre if one of £35 produces the same net income. "De-intensification" is a far from pleasant word in sound and implication, but it sharply defines an interesting and significant development in this part of the country.

The problem of the small farm is always with us but, apart from the Forest of Dean, there are no particular areas in the county which consist wholly of little farms. Rather are they scattered throughout the Vale and, indeed the hill country, and there is perhaps a real difference between the average small farmer in these circumstances and those who farm together in small farming communities, as elsewhere, in the south-west.

All in all, it can fairly be said that Gloucestershire agriculture is a vigorous and forward-looking industry. It has its fair share of those farming pioneers who have such a profound effect on the practices and thoughts of their fellow farmers, and the county has provided many of the most forceful personalities in the farming world. If one of the county's major worries is the increasing inroads being made by urban industry and its attendant swollen populations, we can perhaps derive some comfort from the thought that it will be a long time before we have to face the problems which beset the agriculture of the industrial Midlands and north.

Horticulture in Gloucestershire

R. C. TWYMAN, N.D.H.

National Agricultural Advisory Service, Gloucestershire

Gloucestershire makes full use of its diverse soils to grow a wide variety of fruit and vegetables, for both local and national markets. In recent years, production has been stimulated by the canning, quick freezing and fruit juice extraction industries.

HORTICULTURE may justly claim an important position in Gloucestershire, for no less than 30,000 acres are devoted to the production of vegetable, fruit and flower crops. There are approximately 3,000 horticultural holdings, varying in size from 1 to 350 acres each—by far the largest number being in the 10-acre category. They are scattered throughout the county, but the most intensive market gardens are situated around Bristol, Cheltenham, Newent and Campden.

Probably no other county has a wider variety of soils, which range from Keuper sandstone in the Newent area to Keuper marl in the Lower Vale and Middle Lias on the Cotswolds. It is natural, therefore, that the lime availability should vary considerably, from pH recordings of 2·5 in parts of the Forest of Dean to 8 and over on the Cotswolds. The rainfall, too, varies greatly, from 37 inches in parts of the Forest of Dean to an average of 27 inches in other parts of Gloucestershire.

The hilly nature of much of the county, which is one of the most attractive features, has its drawbacks for those unfortunate enough to have planted fruit in the valleys; the colder air drifting down from the higher ground can prove disastrous, and many of these low-lying sites prove to be in "frost pockets". This applies mainly to the farm orchards, most of which were planted well over a hundred years ago, and consist chiefly of unnamed cider apple varieties, for which there is little demand.

Soft fruits

Gloucestershire is fortunate where markets are concerned. In addition to the local ones of Cheltenham, Gloucester and Evesham, the national markets are fairly near and receive a large proportion of the produce. One of the most significant modern changes is the large quantity of vegetables and fruit being grown on contracts for canning, quick freezing and fruit juice extraction. The production of black currants in particular has greatly increased since a well-known firm set up a juice extraction factory at Coleford and now takes the fruit from approximately 75 per cent of the 400 acres of black currants grown in Gloucestershire, on very favourable contract terms which have done much to stabilize the growing industry. A contract runs for ten years—generally considered to be the average economic cropping life of a black currant plantation, due mainly to the increase in big bud and reversion, for which, unfortunately, there is no completely satisfactory control.

Most of the remainder of the black currant crop is sent to other firms for canning and jam-making—also on long-term contracts; thus very little fruit goes to the free markets.

The main black currant growing areas are Newent and Dymock, where the soil conditions are admirable, and the average crop is about 3 tons, although exceptional yields of 6–7 tons per acre have been recorded. The labour required for picking is considerable, and some growers operate special buses to bring pickers, mostly women, from the towns of Gloucester and Cheltenham. The more experienced of these will pick from 1 to 1½ cwt a day. The fruit picked each day is collected in the evening and conveyed direct to the factory, arriving there within a few hours of picking. The chief varieties grown are Baldwin, Wellington XXX and Westwick Choice, while Mendip Cross, Boskoop Giant and Seabrook's Black are grown on a small scale only.

Approximately 200 acres of strawberries are grown, for the fresh fruit markets and the processing industry. The varieties most widely grown (in order of ripening) are Cambridge 422 (Cambridge Favourite), Royal Sovereign and Talisman. The production of early strawberries is concentrated mainly in the Newent area. It is rather surprising that some of the best flavoured fruit is grown on the Cotswolds at an altitude of over 500 feet, possibly due to less luxuriant plant growth than at lower altitudes. Although ripening later than those in the Vale, crops are heavy, and aphids are not so troublesome at this altitude. Some of the beds therefore have a satisfactory cropping life of three or more years. Most growers prefer the "matted row" system.

A few gooseberries, blackberries and loganberries are grown, chiefly for processing. The keen demand for the latter two crops and the offer of con-

tracts by processors has encouraged growers to think about increasing their acreages, although planting is hampered by the shortage of suitable stocks.

Orchard fruits

The acreage devoted to plums is considerable. The main plum growing areas are Cheltenham, Campden and West Gloucestershire; a small area of the variety Magnum Bonum is still grown around Bristol. The locally raised Blaisdon Red, which was found growing in the village of that name (as the story goes) is still highly regarded by local growers. It is a reliable and regular cropper and is seen growing in hedgerows and on the steep hillsides, where anything but grass is difficult to grow. This is a favourite plum for preserving purposes, being ideal for jam-making. It has the advantage of travelling well, and some hundreds of tons are sent to Scotland every year for jam-making. In the remainder of the county the main varieties grown are Victoria, Monarch, Marjorie's Seedling, Warwickshire Drooper and President. The acreage of Purple Pershore and Pershore Yellow Egg plums has been greatly reduced in recent years, owing to the lack of demand for these varieties.

Gloucestershire is one of the few counties remaining where nuts are grown commercially, for 40 acres of cob-nuts are still grown on a fruit farm near Winchcombe. The bushes were planted about one hundred years ago, but they still bear reasonable crops of fruit. In some seasons as much as 28 cwt per acre have been harvested, despite those taken by rooks and squirrels.

Apple trees planted since the war, mainly of dessert varieties, are now coming into cropping. This increase in crops has resulted in growers erecting cold and gas stores, to facilitate handling and extend the marketing period. The principal dessert varieties grown are Cox's Orange Pippin, Worcester Pearmain, Lord Lambourne and Laxton's Fortune, while Bramley's Seedling takes pride of place as a culinary variety.

Post-war plantings of pears, too—mainly the variety Conference—are now bearing fruit. The behaviour of this variety is, however, a little disappointing, as in recent years the crops have been most irregular. Gloucestershire has the largest acreage of perry pears in the country; there has recently been a revival of interest in this crop as a result of the national advertising campaign to encourage the sale of perry drinks. The cider orchards, which are for the most part to be found on farms in the Berkeley Vale and West Gloucestershire districts, are steadily being reduced, as the farmers take advantage of the grants available for grubbing out derelict orchards. There are very few plantings, despite the increased price being offered, and if the present trend continues, very few orchards of true cider varieties will remain. It is inevitable that this should occur with the change in farming policy, and naturally the specialist fruit-growers are not interested in planting cider varieties.

The area under glass is steadily increasing, and is now in the region of 90 acres, concentrated mainly in the areas of Bristol, Newent, Cheltenham, Campden, and Mickleton. It is noticeable that more and more growers are erecting mobile structures, as an aid to increasing production. The crops grown consist mainly of tomatoes, cucumbers, lettuces and chrysanthemums;

smaller areas are devoted to freesias and carnations. The production of bedding plants is in the hands of a few specialist growers, but from this limited number of nurseries very large quantities of plants are produced annually, a large proportion of which are grown on contracts for the chain stores.

Mushrooms are grown almost entirely around Bristol, and large quantities are sent to markets all over the country from there. This is a highly specialized crop and is therefore likely to remain in the hands of the few.

Vegetables

Vegetables are now grown on contract and on a large scale for canning and quick freezing. Peas, runner and dwarf beans are the main crops. Farmers are more concerned with these than are market gardeners, for they are in a better position to cope with the large acreages entailed, and, what is more important, these crops fit in well with the farm rotation. Large quantities of peas are vined on the farms, and the haulm made into silage. The majority of these are grown in West Gloucestershire—probably because the preserving factories are within easy reach. Most of the 500 acres of peas for picking green are grown on the Cotswolds.

Ninety per cent of the Brussels sprouts grown in Gloucestershire come from the Cotswolds, where soil and conditions are ideal and 4,000 acres are devoted to this crop alone. Sprout growers from the adjoining county of Worcester rent land on the Cotswolds solely for the purpose of growing sprouts, which are later than those grown in the Vale, and therefore extend the marketing.

Mickleton, which is at the extreme north of the county, is well known for early cauliflowers, and almost the whole of the land in this area is planted to this crop. The plants are raised under glass and planted out from February onwards: cutting commences in late May. Small acreages are also grown successfully at Cheltenham, Newent and Bristol.

Potatoes, too, are a very important crop in Gloucestershire, for 5,000 acres are now being grown, 4,000 of which are main crop and the remainder early. Most of the latter are grown in the Newent area, conditions there being very favourable. Apart from potatoes grown for ware, approximately 300 acres are planted over 500 feet up on the Cotswolds for seed potato production, under the Ministry's A Certification Scheme. Cotswold seed has proved so successful when grown in other parts of the country that the demand greatly exceeds the supply.

Land Settlement Association

The Land Settlement Association has one of its estates in the Newent area, on which there are 46 tenanted holdings, each from 2 to 8 acres. These are situated on the Old Red Sandstone, which is easy to work and ideal for early crops. The tenants are in a favourable position as far as small growers are concerned, as they have a combined packing and marketing organization, which is an enormous advantage in these days of keen competition. The area under glass—cloches, Dutch lights or structures—on most of the holdings is considerable. The crops grown consist mainly of soft fruit, lettuces and

tomatoes, with small areas of self-blanching celery, early cauliflowers and chrysanthemums. Most of the work is carried out by family labour.

Apart from the tenanted holdings, the Land Settlement Association farms a further 65 acres, which is chiefly devoted to early potatoes, rhubarb and soft fruit. Much of the produce is sold in the Welsh markets, apart from that being grown on contract.

A large part of this land yields a gross return of £800 per acre, which is proof of the good management. Pre-packaging of such crops as lettuce, tomatoes, strawberries and cauliflowers has been tried in recent years on the estate, with a certain amount of success.

Problems

Horticulture in Gloucestershire has not escaped problems, one of which has been shortage of farmyard manure. This has induced growers to seek a suitable substitute, and many market gardeners are now using grass on the short-term ley principle, to help maintain the structure and fertility of the soil. Labour, too, has been an acute problem since the war, but the situation is now becoming easier, and sufficient is forthcoming to meet all demands.

Lastly, although there is still plenty of good land ideally suited for horticultural purposes in Gloucestershire, it is very rarely on the market, and most expensive to buy when it is. It is sad to see some of the very old-established market gardens on the outskirts of Bristol, Cheltenham and Gloucester being taken for building purposes. This land is almost impossible to replace, as it has been built up over the years to a high standard of fertility.

Farming in Somerset

J. W. DALLAS, M.SC.(AGRIC.)
County Advisory Officer

Somerset and milk and grass are almost synonymous terms, and the county's farming is by tradition mainly devoted to milk production, except in the hill areas of the west where store cattle and sheep are reared.

SOMERSET is one of the larger counties, over a million acres in area, with about 800,000 acres of crops and grass and 90,000 of rough grazings. It is about eighty miles across from Frome in the east to Simonsbath in the west, and about forty miles from Bristol in the north to Crewkerne on the Dorset border.

Grass occupies 87 per cent of the farmland exclusive of rough grazings, and leys account for only one-fifth of the grassland. About 40 per cent of the grass is conserved as hay or silage, and silage-making increases every year. There are nearly 13,000 agricultural holdings larger than one acre, but rather

more than a third are less than 15 acres in size and more than half are below 50 acres. These proportions are approximately the same as for the whole of England and Wales. Orchards account for some 18,000 acres, mostly on farms and for cider, but with the stopping of free cider on farms and the tying of public houses, the interest in farm cider-making has diminished and a good many of the older trees and orchards could well be grubbed.

The Long Ashton Research Station and Cider Institute is close to Bristol; the County Farm Institute is at Cannington, near Bridgwater; and the Ministry of Agriculture has in recent years established an Experimental Husbandry Farm on the southern fringes of Exmoor at Liscombe, Dulverton.

North and East Somerset

One may describe this area as the land south of the River Avon where it passes through the cities of Bristol and Bath, to the Wiltshire border and north of a line from Weston-super-Mare to Wells and Wincanton. The Bristol Channel bounds it on the west and Wiltshire joins it on the east.

The greater part of the area is undulating, with hills to over 700 feet in the north and the Mendip hills, a broad ridge several miles wide and 800—1,000 feet high, forming an escarpment overlooking the central plain and reaching almost to the Channel. The wide alluvial belt which separates the hills from the Channel has been won from the sea, like the central plain, by a careful system of main drainage channels and low-tide sluices, as many parts are below the high-water mark.

Few parts of the country can show a greater diversity of geological formations exposed at the surface. William Smith, the "Father of English Geology", produced one of the oldest geological maps in existence at Bath in 1799. The Mendip Ridge is mainly Carboniferous Limestone, extensively quarried for roadstone and agricultural lime: north of this comes the Somerset Coalfield area around Radstock and Pensford, interspersed with the rich red soils of the Keuper Marls and Red Sandstone series. A broad band of Oolitic Limestone extends from around Bath towards Frome, and yields Fuller's earth and a variety of soft building stone. There is an Oxford Clay belt along the boundary with Wiltshire, south towards Wincanton.

Although the soils are varied, the systems of farming are remarkably similar and are based on milk production, about 95 per cent of the farms being family concerns sending milk to the large local creameries and keeping pigs and poultry as sidelines to supplement the income. The high rainfall, from 30 to 45 inches, and humid climate favour the growth of excellent grass, and the arable area is restricted to crops such as kale, oats and dredge corn for feeding on the farms. At one time, rearing store cattle and sheep was the main occupation on the Mendips and other high land, but in all these areas the dairy cow has taken their place as the pastures have been improved by ploughing, liming and fertilizing and piped water supplies have been laid on.

There has been a marked change in recent years from the traditional Dairy Shorthorn, which used to fill the cheese-tub, to the British Friesian and the Ayrshire, which give more milk. Ayrshire heifers from Scotland are a popular replacement for the reactors culled in the T.B. eradication campaign, and on the small farms which find it more profitable to buy in than to rear their own stock. A large number of cows and heifers—probably one-third—are now

crossed with beef bulls, mainly by artificial insemination, and the calves are sold to go out of the area.

The aim on most farms in the area is to keep food purchases to a minimum, and late-sown kale for strip grazing and Italian ryegrass for early bite are widely grown to extend the grazing season. Silage is conserved on two-thirds of the farms to be fed in the winter in the cowshed or yard. The change-over from cowshed to yard-and-parlour and to self-feed silage has been slow because farmers on these relatively small farms prefer to get the most out of each animal by individual care and attention. The high cost of purchased straw is another deterrent to the yarding system.

Pig-keeping here has to be a well-organized business, as it is almost wholly dependent on purchased feeds. The usual practice is either to specialize in producing "slips" for sale, or to run a well-designed labour-saving fattening house, which will give a good conversion ratio and in which whey or skim milk from the creamery can help to cut the cost.

A few large flocks of Halfbred sheep have recently been started on the Mendips, but generally the flocks are small, containing 20–40 breeding ewes of the Kerry Hill or Clun Forest type. They lamb very early and do not compete seriously with the dairy herd.

Central and South Somerset

Between the Mendip and Quantock Hills lies the greater part of the Somerset lowlands, intersected at intervals by ridges and also by the Polden Hills. Including Sedgemoor, they cover about 155,000 acres, some 20,000 of which are liable to flood during periods of high rainfall. This lowland area is slightly basin-shaped, with the highest land towards the sea, and consists of heavy alluvium, but the centre of the basin is below sea level and has about 30,000 acres of peat. Some of this is dug for fuel and other purposes, but most is used for agriculture—chiefly grass. The whole area is mainly devoted to milk production; the majority of the farms are rather small and also very much fragmented. The farmhouses and buildings are in the villages or hamlets, whereas the fields are usually scattered and access to them is often difficult, owing to the absence of metalled roads. Drainage is quite a problem, and is carried out by ditches and rhines from which the water is pumped into natural or artificial rivers, with outlets to the Bristol Channel controlled by sluice gates. At the southern tip of the area, around the Athelney district, is centred the basket willow growing industry, of some 2,000 acres, which it is believed produce three-quarters of the country's needs.

The Somerset River Board has done and is doing a very fine job in reducing the flood risks and periods of flooding: it has ten pumping stations. The one at Gold Corner, for instance, is inland from Highbridge, drains some 25,000 acres and has four pumps, each of a capacity of 250 tons of water per minute.

To the east of the Somerset Plain, including Somerton, Langport, and Yeovil, there is a large area of higher and rather undulating land consisting mainly of heavy soils derived from the Lias. Here, too, the main source of income is milk production, but farming is more mixed, with some sheep and arable. Within this area there is a tract of soil which gives rise to the disease in cattle known as teart, which causes scouring, loss of milk and, in red cattle,

loss of colour too. This condition is due to excess molybdenum in the soil and its effects are now countered by giving copper sulphate in the concentrated feed. On this soil there is a small area devoted to growing teazles, which are still used in the woollen industry and go mostly to Yorkshire.

Further south, around South Petherton and Ilminster, there is a large area of fairly rich and easily-worked soil which has given rise to a diversified system of farming including dairying, corn growing and market gardening. The standard of farming here is high—some think the best in the county. Sugar beet is grown, and flax used to be an important crop.

Adjoining the Devon boundary from Chard to Wellington, the Blackdown Hills rise to a height of about 800 feet. The soil here is mainly clay with flints. Farms are small, as soil quality and the contours combined with a high rainfall make farming rather difficult. Again the main enterprise is dairying, supplemented by a comparatively high return from pigs and poultry. Lying between the Blackdown and Quantock Hills to the north there is the renowned Vale of Taunton Deane. This, too, is a fertile area, derived mainly from the Red Sandstone. Farming is very mixed but milk production is increasing.

West Somerset

To the west of Taunton is the true hill country of West Somerset, which consists of the Brendon Hills and Exmoor, most of which is in Somerset, although part of it is in Devon. The highest point on Exmoor is Dunkery Beacon (1,707 feet), but much land is cultivated up to heights of about 1,400 feet, although the majority of cultivated land would be below the 1,000 feet contour. Rainfall is high—up to 80 inches per year in the high parts. Soils are derived from Red Sandstone and Devonian Shale and, owing to sharp contours and heavy rainfall, are usually rather poor and need frequent applications of lime and fertilizers. The whole area is traditionally stock-rearing, but on the smaller farms, particularly on the slopes of the hills, milk production has become important of late years. Recently, too, much improvement in this area has been effected with help from the Livestock Rearing Act, Hill Cattle and Sheep Subsidies, so that some sheep are now actually fattened instead of being sold as stores. Devon cattle are kept mainly, though a few of the large farms with extensive hill rights run some Galloways. These farms, too, run Cheviot sheep, whereas most still continue with the Exmoor Horn breed or Devon Closewools. Exmoor ponies are bred on places like Withypool Common—some 1,800 acres of rough grazing. Between the hills and the coast there is a strip of lowland which runs from Porlock to Williton, where mixed farming is practised and the barley crop is quite important. Early fat lamb is one of the products from flying flocks of Dorset Horns or Dorset Downs.

Milk and cheese

Cows and heifers in milk and in calf total fully 190,000 and there are 7,000 registered milk producers, though there are cattle on 10,000 holdings. The county was declared an eradication area for bovine tuberculosis on 1 March 1958, and fully two-thirds of the producers now sell tuberculin-tested milk, and the gallonage is greater than that proportion. Although

there is relatively little milk produced west of Taunton, more is sold than from any other county in England—117,192,000 gallons for the year ended 1 October 1951—an increase of 11 million gallons over the previous year. Included in the total, however, there is the gallonage made into farmhouse cheese, and this too continues to increase—it is believed to have amounted to some 4,600,000 gallons in the year ended 1 October last, which was one million more than in 1955–56.

The visit of the Royal Agricultural Society's Show to Bristol this year prompts the reflection that the showground is only a "stone's throw" from the home of Mr. Joseph Harding, whose name became a household word among makers of Cheddar cheese the world over.

Somerset is the original home of Cheddar cheese, and the first known precise description of making was written in 1856, as a report of a visit of the Ayrshire Agricultural Society to study the method of cheese-making used by Mrs. Harding of Marksbury and her nephew Joseph of Compton Dando.

As a result of this visit, Mr. Harding accepted invitations to lecture in Cheshire and Ayrshire, and it is interesting to read from his lecture notes that there was much controversy concerning the possibility of making good cheese from milk which had been transported. Mr. Harding maintained good cheese was being made in Somerset from milk carried as far as ten miles! He travelled far and wide teaching his methods, and has left his mark on Cheddar cheese-making as practised in the West Country today.

It was in 1860, almost a hundred years ago, that he contributed a paper to the *Journal of the Royal Agricultural Society* on recent improvements in dairy practice. These improvements concerned the slip-scalding of the curd in its pulpy state in the whey, which experience has shown, produced a finer cheese, and an attempt to ripen cheese more quickly by keeping it at a temperature of between 50 and 70°F.

A deeply religious man, he combined preaching with teaching, and always found time to help anyone in distress.

It is interesting to find that last year—1957—over three and a half million gallons of milk were made into Cheddar cheese, while just over a million were converted into Caerphilly. The increase in the quantity of milk converted into farmhouse cheese is the result of the encouragement of co-operative making by the Milk Marketing Board. This permits the combining of the cheese-maker's milk with that of his neighbour's (the total amount taken in being limited) so that overhead costs are reduced.

Correction

Silage for Milk and Meat (June 1958 issue, p. 107) the table should have read:

Crop	*Cost per ton of starch equivalent* £
Grazing	11·0
Grass silage	17·2
Hay	29·7
Kale	16·9
Rape	12·3
Arable silage	34·0
Oats	30·2
Barley	21·3
Dairy cake (at £35 per ton)	53·8

Cheddar Strawberries

J. E. FORSHAW

National Agricultural Advisory Service, Somerset

Dessert strawberries produced to perfection in the early district of Cheddar are marketed in the Midlands and North of England.

FROM a horticultural point of view the Cheddar area is unique, in that almost all available land is used for market-garden crops, and a large proportion of these are strawberries. Cheddar village stands at its centre, with Axbridge to the west and Draycott and Rodney Stoke to the east. The area lies in a bay formed by the Mendip hills which give protection from most winds blowing from the north, north-west and north-east, although occasionally north-east winds channelled through the gullies may cause damage, especially in March and April. The slope of the land is considerable, particularly in the higher areas. This is mainly to the south, thus the soil warms up early in spring.

The soil of the slopes varies from shallow near the top to about two feet or more near the main road. The lower levels south of the road merge into a different soil type, and soon blend into a sedentary soil which, although fertile as grassland, is not so suitable for arable crops and, because of its valley exposure, is not suitable for horticultural crops. In the main the soil is well drained and of medium texture, with a very variable fertility, reflecting the cultivation practices over a number of years. Generally speaking, the lime content is high, partly because of the limestone rocks below and partly by reason of the substantial dressings of lime which have been given from time to time.

Attraction to small growers

The district is one of small cultivators—from not more than ten acres to the smaller ones of about half an acre. In many instances the holdings consist of three or four widely separated parcels of land, where the owner has been able to obtain additions at different times. This is a great disadvantage in some respects, although where one plot is capable of producing very early crops there is some advantage in spreading the period of fruit picking. In some of the larger fields a number of growers have one-acre plots, and so divide the land without fences. The majority of growers live in the villages and have small stores and sheds in their various fields.

The cropping of the Cheddar area has, during the past 200 years, developed mainly in relation to the early aspect of the land. In the late nineteenth century the main crop in the area was early potatoes, produced for the Bristol market. In those days the growers delivered direct to Bristol, using conveyances drawn by the same horses as were used for cultivating the land.

Strawberries as a crop were introduced into the district around the turn of the century. They rapidly gained favour when it was found that crops could be picked in the Cheddar valley ten to fourteen days earlier than in the sur-

rounding areas, and they did exceptionally well on land that had been manured for early potatoes. The first varieties were Leader and Noble; later, Paxtons were also grown. But with the introduction of Royal Sovereign, this high-quality dessert variety quickly came into demand: all the fruit from Cheddar was, and still is, used for fresh fruit consumption.

By the 1930s, however, strawberry growing had taken a distinct turn for the worse throughout the country generally, due mainly to the spread of certain virus diseases. The answer was found in the excellent work which our research workers have done in raising virus-free stocks. It has proved of inestimable value to the Cheddar strawberry industry.

Maintaining soil fertility

While virus diseases were giving growers such trouble immediately before the second world war, the fertility of the soil at Cheddar was declining seriously. This was due partly to difficulties in obtaining suitable farmyard manure and partly to a general lack of understanding of local soil problems. More recently, progressive growers have developed a far better knowledge of how to maintain soil fertility and, in addition to obtaining supplies of organic material from various sources, they are now practising methods of very short leys to maintain soil structure.

A lot of work has been done to help growers control pests and diseases—and there are plenty to worry strawberry growers! *Botrytis*, which causes the fruit to rot, either on the plants or on the way to market, is a serious menace. Of the pests, probably the strawberry aphid causes most trouble by carrying virus diseases from plant to plant and from field to field. Very intensive cropping of the land allows only small types of sprayers to be used, and a lot of thought has been given by growers and advisory officers to this particular problem.

In the early days of strawberry growing at Cheddar most of the fruit was sent to Bristol and other local markets, but nowadays the majority goes to the Midlands and North of England. A great deal of the crop is picked into half pound punnets, which are nested into larger trays and sent by road or rail direct to the market salesmen. The majority of growers fully recognize the importance of attractive packaging, and only in seasons when the weather is difficult are there any serious complaints about the condition of the fruit.

Important considerations in strawberry growing are high quality, flavour and appearance, but of course, growers like heavy crops as well. Thought, too, must be given to the season of picking, and first or second early varieties must be chosen for the majority of the fields. Royal Sovereign is still grown in the area, although most growers are now cropping a fairly high proportion of such varieties as Cambridge Favourite, Prizewinner and Vigour. The later varieties such as Talisman are being grown in the lower fields.

Anemones, as an alternative crop to strawberries, have been arousing a good deal of interest in the district during recent years. This has provided something of a limited rotation in crops, especially where some potatoes and spring cabbage can also be taken. But, anemone growing has latterly presented some very difficult problems, and so a high proportion of the market-garden land at Cheddar continues to be devoted to strawberries as the main crop. With sound maintainance of soil condition and fertility, and a

watchful eye for pests and diseases, there seems no reason why a fairly high proportion of the land in the area cannot continue to be devoted to this crop. It does, of course, involve a relatively high amount of labour, but during the peak season much of this is provided by the family. There appears to be a good prospect for good quality dessert strawberries, and it is in a specialist area such as Cheddar that they can be produced to perfection.

On the whole, it is fair to say that there is a thriving area of strawberry growing at Cheddar, most of it in the hands of hard-working, careful growers, who are alive to the need for producing first-class crops and who have to take advantage of all the new techniques and developments which present-day science can produce. There are good seasons and bad seasons; and higher prices in the bad seasons do not always cover the losses which bad weather or pests and diseases inflict, but the good grower has learnt the need for balancing his returns over the years to help him through the leaner times.

Badminton

D. H. DRAPER, A.R.I.C.S., Q.A.L.A.S.
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The Duke of Beaufort, whose family estates are at Badminton, is this year's president of the R.A.S.E. He is also the Lord Lieutenant of the county of Gloucestershire and High Steward of Bristol, and has in past years served on the County Agricultural Executive Committee.

BADMINTON, the centuries-old home of the Duke of Beaufort, provides a happy example of the blending of the best in the new and the old in the management of a large agricultural property. Lying on the western edge of the Cotswolds, six miles from Chipping Sodbury, it covers some 17,000 acres—mostly in Gloucestershire and a small part in N. Wiltshire.

The estate was bought by the Somerset family from the Botelers at the end of the sixteenth century and became the main seat of the family following the surrender by the first Marquis of Worcester, a friend of Charles I, of Raglan Castle with all the honours of war to the Parliamentary forces in 1646. Cromwell subsequently relented and allowed the formation of the great deer park at Badminton which now stretches from the house to the domed Worcester lodge, the work of William Kent and a landmark some three miles from the house on the Tetbury road.

The house itself which is set at the south end of the park, with the church of St. Michael adjoining, is very large and in the Palladian style, having been rebuilt by the first Duke at the end of the seventeenth century. It houses a valuable collection of oil paintings, including family portraits going back to John of Gaunt, from whom the family is descended, some views of Badminton by Canaletto and a number of carvings by Grinling Gibbons. And it was in the hall here, one wet Victorian afternoon, that the game of bad-

minton originated—a recreation that was destined to become so popular throughout the world. The late Queen Mary lived at Badminton during the greater part of the war years, taking a keen interest in all the activities of the estate, even helping in clearing woodland areas for replanting.

Roger North gives us an interesting description of life at Badminton in the reign of Charles II, stating that there were—

> Two hundred persons in the household all provided for and nine original tables covered every day, the tables being properly assigned, as for instance the chief steward with the gentlemen and pages, the master of the horse with the coachmen and liveries, etc. Soap and candles were made in the house, so likewise the malt was ground there, and all the drink that came to the Duke's table was of malt, sun-dried on the leads of the house.

After describing the entertainments for the guests, many of which were out of doors, he concludes, "but no sitting at a table with tobacco and healths, as the too common use is."

In recent years Badminton has won fresh fame as the home of the popular Three Day Horse Trials. It was in 1949, when the British Horse Society was faced with the difficulty of producing a first-rate team for the Olympic Games, that the Duke, in keeping with his post as Master of the Horse, offered his estate for the trials. Since then Badminton has led the way to a country-wide series of such events.

The trials have been regularly attended by the Queen with the Duke of Edinburgh, Queen Elizabeth the Queen Mother and other members of the Royal family, occasions which have been characterized by the free and informal manner in which they have mingled with the thousands of people who come from all parts of the country. The first part of the trials is devoted to dressage, followed by the speed, endurance and cross-country test and concluding on the third day with show-jumping. The park, some ten miles in circumference, makes a beautiful setting for these trials. This year saw the notable win, for the second year in succession, of Miss Sheila Willcox on her famous horse, High and Mighty.

Swing of the pendulum

After the death of the 9th Duke in 1924, a number of farms had to be sold, but in recent years a number of farms in the Sodbury Vale and around Alderton in Wiltshire, as well as in the West Kington area have been bought and added to the estate. Some sixty farms, mainly large—up to 800 acres—are let to tenants. The farms are predominantly dairying with substantial arable acreages, but beef herds and sheep flocks, to which recent years have seen an increasing return, are also a feature.

It is interesting to note the cycle of farming policy during the past quarter of a century in the Badminton area. For several generations until the 1920s, the farming economy of these Cotswold farms had been based on beef cattle, sheep and a barley–roots arable rotation. The tendency during the depression of the late 1920s and early 1930s was, as elsewhere, to abandon beef and mutton in favour of milk. Farm buildings were converted accordingly—fattening stalls were turned over to milking, folded sheep disappeared and arable went down to grass. Milking bails appeared in the fields instead of lambing pens. Now, twenty-five years later, the pendulum is gradually swing-

ing back—beef bulls are being used on dairy herds, their progeny being raised for beef instead of being slaughtered for veal, and sheep are coming into their own again.

Home farm and park

The Duke farms about 1,200 acres himself, chiefly the park and land surrounding it. The home farm supports a pedigree Shorthorn dairy herd of about 70, an Aberdeen-Angus beef herd of about 70, a crossbred Clun-Suffolk flock of about 300 ewes and a pedigree Large White herd of pigs, with about 20 sows. In addition, there are still a few pedigree Percherons which have recently been used to cross with thoroughbreds to produce heavy-weight hunters.

The home farm buildings lie at the south end of the park, behind the house. Here again, improvements have been made to the stock buildings and a grass drier has been installed, for which 50 acres of lucerne are normally grown. The 9 acres of kitchen garden are run on a commercial basis, the produce being sold to the neighbourhood and town markets and some supplies going to the house.

A herd of Red and Fallow deer is also kept in the park, from which meat is sold to the London market. Fresh blood was introduced into this herd by a gift of stags from King George VI when the Windsor herd was given up.

The attractive farmhouses and buildings on the estate are substantial, built with local Cotswold stone and roofed with the traditional stone tiles, and the majority of fields are bounded by the local dry stone walling. Since the war a heavy expenditure has been incurred, chiefly on improving milk and dairy buildings, bringing cowhouses up to modern standards or erecting milking parlours, providing Dutch barns and extending water and electricity supplies. Practically all farms are now on mains water and mains electricity.

Few farms change hands. Those becoming vacant are usually let either to sons of tenants on the estate, or to farmers and farmers' sons in the district, known personally to the Duke. Most of the farms are let on agreements under which the estate is responsible for main walls, roofs and main timbers and for supplying materials for other repairs, apart from interior work. Model repair clauses have, however, been incorporated in the more recent lettings.

The woodlands, covering about 1,600 acres, are managed by a head forester and ten men. There is an estate sawmill with horizontal, circular and bandsaws and yard, with creosoting tank near the house and a small sawmill in the woods. The bigger timber is sold, but the bulk is used on the estate for gates, fences, and roof timbers; only floor boarding is purchased. The biggest woods are at the north end of the park and at Lower Woods, near Wickwar. These were planted in the last 20–25 years with larch, Scots pine, Douglas fir and with some hardwoods, oak, ash, and beech. The woods at Wickwar were completely felled during the war by the Ministry of Supply, and these and other woodlands on the moister and deeper soils are now being gradually restocked—mainly with poplar (*P. eugenei*), for which a nursery has been established in part of the old kitchen gardens. There are also many smaller woods and coverts, and we must mention the fine beeches and ancient oaks in and surrounding the park. About 20 acres in all are

replanted annually with, besides poplar, Douglas fir, Sitka spruce, Japanese larch, Scots pine and beech. Timber for fencing is also brought from the Duke's woodlands in Monmouthshire.

Estate on company basis

For the past twenty-five years the Duke's interests in the estate have been organized on a company basis, and the Duke himself takes the greatest possible interest in all matters relating to the management of the estate and in the well-being of his tenants and staff. All departments are administered by the Commissioner, Major Nelson Rooke, a partner in the managing firm of Rooke, Hobbs and Co., from the Estate Office through the Clerk of Works, farm manager, head woodman, head gardener and other heads.

The estate includes over 300 cottages, a number of which have been improved in recent years by grants under the Housing Acts. In addition, sixteen new dwellings have been provided in Badminton since the war, either by new buildings or conversions. Repairs are carried out as far as possible by the estate staff of about nineteen men, but most new building and a good deal of the repair work has to be put out to contract. A club, equipped with billiard room, a skittles alley and television, is maintained for estate employees and residents.

Besides the agricultural properties in Gloucestershire and Wiltshire and the woodland areas in Monmouthshire, the Duke's landed interests also extend to some 40,000 acres of mountain and common lands in Glamorganshire and Breconshire. These areas are subject to commoners' rights of inter-common and carry large numbers of sheep, cattle and ponies. Control is largely by haywards appointed by the Duke as Lord of the Manor, and periodical leet courts are held through his Stewards of the Manors.

It can be said that the amenities of the Badminton estate and the charm of its Cotswold buildings have been happily preserved, together with the sporting life of a landed property, while the changing needs of the farms are being met to suit the present day.

I should like to acknowledge the kind consent of His Grace the Duke of Beaufort to the writing of this article and the help and advice given by Major Nelson Rooke in its preparation.

INCREASED SUBSCRIPTION RATES

It is regretted that because of higher postal charges the annual subscription rates for *Agriculture* have had to be increased. From 1 August they will be:

Home and Imperial	11*s.*	including
Foreign	12*s.*	postage

Current subscriptions will be subject to the new rates on renewal.

The net price will continue to be 9*d.* per copy.

The Farming Pattern of North Wiltshire

PATRICK H. WELLS, M.A.(CANTAB.)
National Agricultural Advisory Service South-west Region

WALK up the steep slope of Liddington Castle, as Swindon's Richard Jefferies often did nearly a century ago, and when you reach the 900 feet summit look north and north-west across the famous Vale of the White Horse. North Wiltshire will be stretched out at your feet. It was this perfect view which probably inspired Jefferies in his *Story of my Heart* to write "My thought went up through the illumined sky, and I was lost in a moment of exaltation". Surely everyone seeing that view must experience that same feeling of exaltation. It is by means of this panoramic view of the Vale that I can best describe North Wiltshire—an area bounded by the "young" Thames in the north and the Marlborough Downs in the south. It is like a giant staircase with a different soil type on each step, giving farming systems ranging from all dairying on the Oxford and Kimmeridge Clay soils, to corn and dairying on the limestone, chalk and gravel.

The northern edge of the Marlborough Downs is mainly Middle Chalk, with occasional patches of Upper Chalk at the higher points such as Liddington Castle and Barbary Castle. Much of it was unploughed before 1939, and where the popular "Brown Jack", six times winner of the Queen Alexandra Stakes, was trained nearly thirty years ago, there now grow corn crops in rotation with leys and roots for winter folding by sheep. This is a narrow belt which soon drops down 200 feet at its northern edge to a terrace of Lower Chalk, which varies from only half a mile wide at the foot of Liddington Castle to nearly three miles at Broad Hinton.

Corn and long leys

This Lower Chalk forms a very sticky loam that is difficult to work, especially in a wet season. Nevertheless, the rotation is corn alternated with long leys, kale, and an occasional crop of Majestic potatoes. The most popular wheats are Cappelle Desprez in the autumn, and Atle in the spring. This popularity of Atle is founded on the fact that it always stands, yields, and sells well, but does not "grow out" nor "shed"—very important assets on land as late as this. Barley has almost completely replaced oats in recent years, popular varieties being Rika and Herta, because maximum yield is the only consideration; malting samples are rare. These soils are generally high in lime and phosphate but low in potash. The main stock kept to graze the leys are dairy cows and their followers, Friesians and Ayrshires being the most popular breeds. The kale is strip grazed before Christmas but, due to the sticky soil, cattle are usually housed in the winter to avoid poaching. After Christmas, cattle are fed on grass silage and hay. Sheep are carried on many of these farms as scavengers, the Scotch Halfbred ewe for crossing with Down rams being the most popular. Since these farms grow more straw than they need, the small farmer in the Vale comes up and buys the straw in the swath and bales and carts it home himself—a very useful piece of

co-operation which helps to justify a small Vale farmer having a baler, and makes burning straw a rare sight on these farms.

Smallholdings

On the northern edge of the Lower Chalk another 200 feet of almost vertical escarpment drops to the Kimmeridge Clay. This belt runs north-east from Hilmarton through Wootton Bassett to the Berkshire border at Bourton, and is about three miles wide. Swindon's old town, the home of the "Moonrakers", is an island of Portland Beds (still used to provide building stone) in a sea of Kimmeridge Clay. The soil is mainly a heavy loam, except at the southern edge where the sand content makes it a medium to light loam. The soil generally needs liming every five to ten years, and the phosphate and potash content is medium to low.

Most of the farms are small dairy farms of under one hundred acres and, of these, many are County Council smallholdings. Dairy herds are the main source of income on these farms, Friesians and Ayrshires again being the most popular breeds. Pigs (most of them sold as weaners) and poultry are supplementary enterprises to increase the turnover. Permanent pastures predominate, but leys are slowly replacing them, especially where drainage work has been carried out. The land is generally too wet for strip-grazing of kale, and therefore a lot of silage is made, particularly from "aftermaths", to help cheapen the cost of winter milk production and to ensure that pastures are "fed out" before stock have to be housed for the winter. This necessity to house all cattle to avoid poaching in the winter often makes building accommodation available on holdings the factor which limits the number of livestock kept. The land will often carry a cow to every 1½ acres, but housing often limits it to 1 cow to 3 acres. There are very few bulls in this area, most farms using A.I. from the Milk Marketing Board Centre at Chippenham. However, the number of "flying herds" about equals the number of herds where replacements are reared, although it is possible that the very good trade recently in week-old "colour-marked" calves may see the number of flying herds increasing.

On the north-western edge of the Kimmeridge Clay, forming another escarpment, is a belt of Corallian limestone about a mile wide, which forms a medium loam, with a high lime content, but having only a medium to low phosphate and potash content. It is mainly used for corn grown in rotation with leys. Dairy herds are the main convertor of the leys into cash and, although Friesians and Ayrshires are the most common breeds, there is a sprinkling of Shorthorns, Guernseys and Jerseys. At Purton, in the middle of this belt, market-garden crops are grown. The deciding factor must be the closeness of the market afforded by expanding Swindon, because the soil is a medium to heavy loam and, being exposed to the north and east, early crops are not encouraged.

Traditional dairying

If we go north again there is another steep slope of 100–200 feet down on to the Oxford Clay belt which is bounded on the north by the Thames. The clay soil requires dressings of lime every five to ten years, and generally has

a medium to low phosphate and potash content. This is a traditional dairying area, and milk-churns are to be seen at almost every farm gate, waiting for the lorry from one of the four milk factories. Poor drainage, coupled with very little "fall", is the inherent difficulty of farming this land, and often makes mole drainage impossible. Where tile drainage has been carried out, corn crops and leys are grown successfully. A lot of this land is in ridge-and-furrow, so helping to remove some of the water, although hay- and silage-making are not easy on these fields. The necessity to house cattle in the winter again makes housing the factor limiting the number of cattle kept. The increasing practice of autumn silage-making, and of keeping a few ewes or store sheep through the winter, helps to solve the big problem of "feeding out" pastures after the autumn flush of grass.

On the extreme north-west of the county, around Malmesbury, the earliest geological formation in the district—Cornbrash—is found. However, where the Gloucestershire border turns to run east and the Thames enters the county, the soil is derived from the youngest Jurassic Limestone gravel. This gravel belt is narrow in the west at Oaksey, but is nearly a mile wide near Cricklade and Hannington. Soils vary from gravelly, light to heavy loams, but liming is not often required, and phosphate and potash contents are medium to low. Corn is grown extensively on the Brash and on both sides of the Thames, with leys, kale and maincrop potatoes making up the rotation. Most of the farms are over 150 acres. Dairy cattle and their followers are the main stock kept. Steer calves (beef cross and pure-bred) from the dairy herd are often reared and fattened. Scavenger flocks of sheep (Scotch Halfbreds, Clun, and Kerry Hill), pigs and poultry are supplementary enterprises.

Good silage the rule

Due to the predominance of grass in the district, it is no wonder that silage-making is discussed as much as hay and corn harvest. High-quality silage is the rule rather than the exception, and poor silage is frowned upon as much as bad drilling! In a traditional dairying district it is inevitable that a lot of capital and thought should be spent on modernizing buildings, the emphasis being on saving labour. Almost without exception, all herds are now machine milked. There has been a marked swing over to the yard-and-parlour system with dehorned dairy cattle; but there are indications that this is not the perfect solution as might at first appear, and new ideas are continually being tried out.

William Cobbett riding through North Wiltshire in 1826 wrote: "This is a cheese country; some corn, but generally speaking it is a country of dairies". His only amendment to that today would be to substitute milk for cheese. It was the whey from cheese-making which led to bacon-curing industries being developed at Calne and Swindon—names which are now household words here and overseas. Many families have farmed successfully in this district for a number of generations and there is no question at all that they have made a marked contribution to farming affairs both within the county and nationally.

The Royal Agricultural College, Cirencester

H. N. JACOBS, A.R.I.C.S., N.D.A.
Warden and Bursar

It is appropriate that this article should appear in a year marked by the retirement of Robert Boutflour from the office of Principal after twenty-seven years, during which period the Royal Agricultural College has made unprecedented progress and increased its student numbers tenfold.

THE Royal Agricultural College traces its origin from an address on "The Advantages of a Scientific Education for Agricultural Students" given by Robert Jefferys Brown to the Cirencester and Fairford Farmers' Club in November 1842. The interest stirred by Mr. Brown's address led to further meetings in other towns, including Southampton, during the Royal Agricultural Society's gathering. Finally, in April 1844, at a public meeting held in Cirencester under the chairmanship of the then Earl Bathurst, the necessary resolution for the inauguration of the College was passed.

The College Arms.

Subsequently Earl Bathurst offered a farm of 400 acres in a suitable position on a long lease. The capital was raised by 400 proprietary shares of £30, each shareholder having the privilege of recommending a pupil. Among the early shareholders were the Marquis of Lansdowne, the Earls Bathurst, Ducie and Fitzhardinge, Sir M. Hicks Beach, Bt., two M.P.s in Messrs. Scrope and Langston, and a number of farmers in Wiltshire and Gloucestershire.

On 27 March 1845 a Royal Charter was obtained incorporating the Governors, Proprietors and Donors under the style of "The Agricultural College for teaching the science of agriculture and the various sciences connected therewith, and the practical application thereof in the cultivation of the soil and in the rearing and management of stock". Soon afterwards the College received the high honour of the patronage of H.R.H. Prince Albert, who showed practical interest by becoming a Governor and giving tangible support by taking up shares in the College.

Building began in the following month, and during that period staff and students were housed in Cirencester. Finally, in April 1846, the students moved into the College itself, and by the autumn of that year nearly 90 students came into residence and a number of senior students were additionally lodged in Cirencester.

The College continued to develop, and in March 1880 Queen Victoria was pleased to command that the College be styled "Royal Agricultural College".

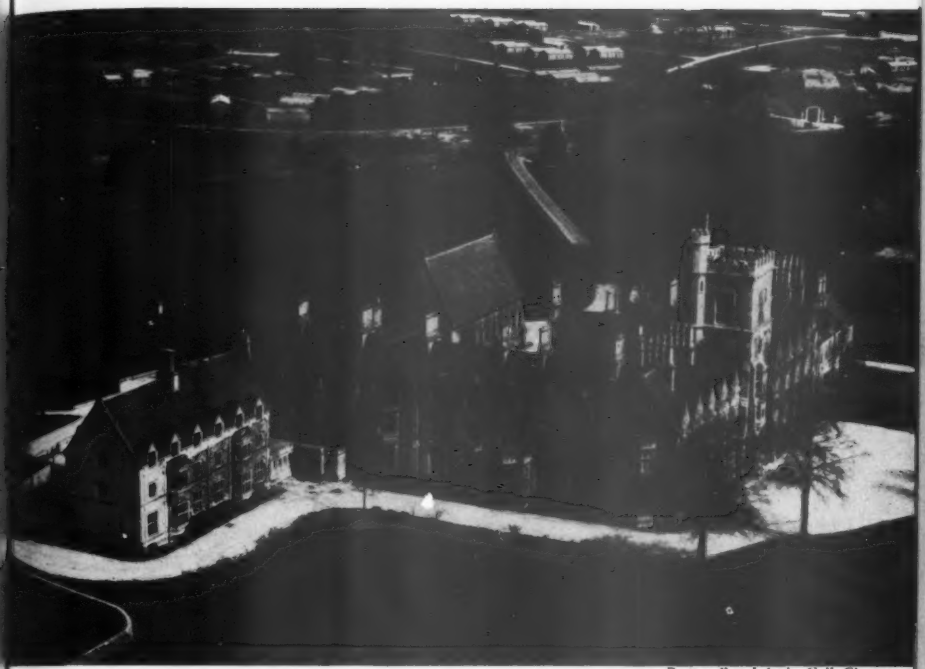


Photo: *Royal Agric. Coll. Cirencester*

View from the air.

Photo: *Central Press*

The seventeenth century tithe barn, now the students' common room, is the oldest part of the College.

Photos: *Eagle Photos Ltd.*

Cotswold landscape at North Cerney, showing the traditional dry stone walling typical of the area.

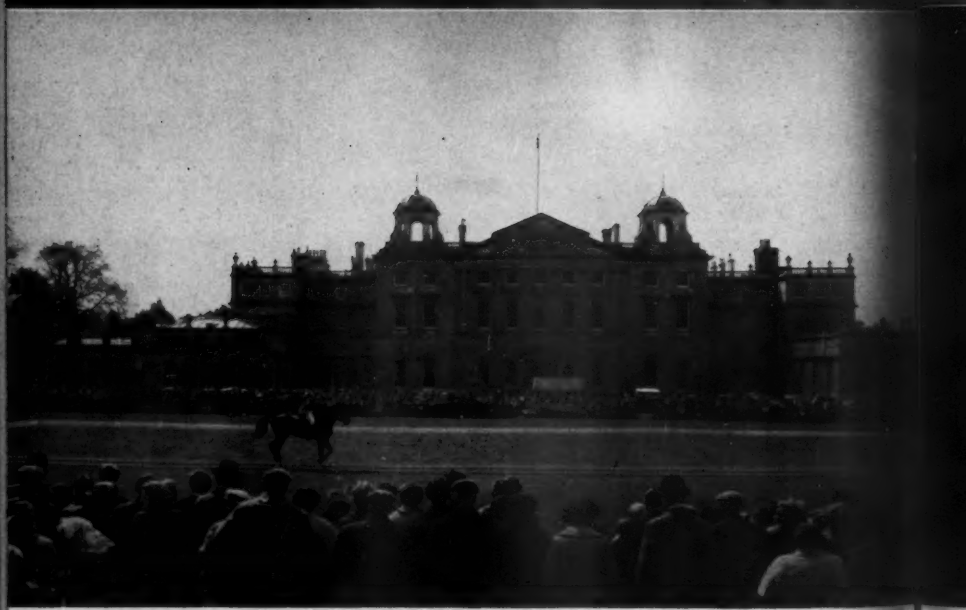
Yarded stock at Winson, near Bibury. Concrete tiling is being used nowadays since the old stone tile is no longer made. The two blend successfully when weathered.

(Article on pp. 164–8)

Photos: *Eagle Photos L*

Cirencester Park, the home of the Earl Bathurst. A flock of ewes and their lambs crossing a ride after dipping.

A fine stand of Jubilégem wheat at **Pamington Fields.**



Photos: *Farmers Weekly*
The Times

The Three Day Horse Trials

Miss Sheila Willcox winning this year's event on her eleven-year-old gelding "High and Mighty".

The dressage event in front of Badminton House. Mr. F. E. Marsh on "Wild Venture".

(Article on pp. 179–82)

Photos: *K. R. Aunge*

The home farm buildings.

Estate yard and sawmill.

Photos: *Crown. Eagle Photos Ltd.*

Withypool Common. Mr. J. W. Dallas, the County Advisory Officer, surveys a pleasing prospect.

Cheddar. Almost all the land here is used for market gardening, a large part of it for strawberries.

(Article on pp. 172–6)

Photos: *J. D. U. Ward*
Commercial Camera C

Arable and pasture behind Blue Anchor bay.

Dorset Horns under Dunster Castle.

Tithe Barns of the South-West (Article on pp. 195–8)

Photo: *Eagle Photos Ltd.*

A fine medieval tithe barn once belonging to Glastonbury Abbey.

The porch of the fifteenth century barn at Abbotsbury.

Photo: *J. D. U. Ward*

After the death of the Prince Consort, H.R.H. Prince of Wales, later to become King Edward VII, became its patron.

Early days—research and teaching

The formative years of the College were beset by monetary difficulties, as was to be expected of such a new venture ineligible for support from public funds. Only by the liberality of certain people was the College able to survive—in particular, Mr. Edward Holland, Earl Bathurst, Earl Ducie, Mr. J. H. Langston, M.P., and Mr. T. G. Bucknell Estcourt.

Among early visitors to the College were Charles Dickens, whose son was a student here, and Mr. Ezra Cornell, who later founded Cornell University, New York. An article in Dickens's *All the Year Round* refers to one department of Cornell University "which is planned upon the model of Cirencester".

It is difficult to exaggerate the work of the College during the nineteenth century. Research and teaching marched side by side, and there is no doubt that the work carried out at the College made a considerable impact on farming practice and the growing field of agricultural education. The present students' common room, a beautiful old tithe barn (seventeenth century), illustrated on p. i of the art inset, was used in those days as a chemistry laboratory. It was here that John Way carried out his research on the *Analyses of the Ashes of Plants and the Absorptive Powers of Soils.* John Blyth followed on and is remembered especially for his editing of Liebig's *Natural Laws of Husbandry*. During the period 1849–63, J. C. A. Voelcker did much of the early work on soils and fertilizers, unexhausted values and the introduction of potash. He was succeeded by Sir Arthur Church, who was author of the *Laboratory Guide for Agricultural Students.* About this time Robert Warington carried out his important work on nitrogen.

Many famous names come to mind when we think of the Professors of Agriculture which the College has seen. There was John Wilson, whose centenary is being celebrated this year at Edinburgh University, where he was Professor of Agriculture after leaving Cirencester; there was John Wrightson, who wrote several text-books on agriculture and pioneered the important work on basic slag; and there was Professor Wallace, who succeeded Wilson at Edinburgh and wrote *British Breeds of Livestock.* Of the Professors of Natural History, special mention must be made of John Buchanan, pioneer in plant breeding and producer of the "Student" parsnip. William Fream, whose *Elements of Agriculture* has gained world-wide renown, and Sir George Stapledon, whose work on British grassland practice has revolutionized agricultural thought. Among the early Professors of Veterinary Science were George Thomas and Sir George Brown, later to become President of the Royal Veterinary College. Major Duncan joined the College as Professor of Veterinary Science over fifty years ago and retired only last year. He is living in Cirencester and is a welcome and frequent visitor. Six members of the College staff in the early days have been elected Fellows of the Royal Society, and three have received knighthoods.

To the Royal Agricultural College also belongs the credit for pioneering agricultural advisory work. Hardly anything was done in this direction at the end of the nineteenth century, and before 1890 the students at the College

appointed old students to give lectures on agricultural subjects in country places. The present comprehensive nature of agricultural education in this country is due in no small way to the earlier spade-work carried out by old students, whether as landowners, land agents, farmers or administrators.

The Bobby Boutflour régime

The College had unfortunately to close its doors soon after the outbreak of the first world war, as most of its students and staff were serving in other spheres, and it was not until 1922 that the College was reopened, thanks to a grant from the Ministry of Agriculture and the generous contributions of old students and friends of the College. Among those who helped in particular at this time was perhaps the greatest old student of all time, Viscount Bledisloe, who, now in his ninetieth year, is still a Governor of the College and taking a most active interest in his *Alma Mater*. Professor Dunstan, who was Principal at Wye College, was appointed Principal. When he retired in 1927 he was succeeded by Professor Hanley, later to become Professor of Agriculture at Newcastle. He was succeeded in 1931 by Professor Robert Boutflour, who was Director of Dairy Husbandry and who had previously made a considerable reputation in the area as Agricultural Organizer for Wiltshire.

When Bobby Boutflour, as he is affectionately known, came to the College in 1931 there were 48 students at the College, and all his vigour and vision were directed to making the College the leading centre for the training of farmers and land agents. At that time the farm consisted of approximately 57 acres, the present Steadings Farm, and the whole country was in the grip of a major depression. By 1933 student numbers were on the increase and in fact rose steadily until the College again had to close when the second world war broke out. During this first eight years of his office as Principal, Boutflour had added 150 acres to the land farmed by the College, he had built a new wing to the College (the George V Wing) to house a further 20 students, and had built modern laboratories which were ready for occupation in 1939 had the war not intervened. But most important of all, the College was full to capacity for the first time for very many years.

The College was requisitioned for the whole of the period of the second world war, but in October 1945 the Principal, who had spent the war years as Chief Executive Officer for Gloucestershire, was invited to reopen the College, and given £10,000 to restock and equip some 420 acres of farms. A completely new staff had to be engaged and almost a completely new set of students enrolled. Eighty students took up residence, but by 1952 the College had 491.

The highlight of the first year of reopening was a visit by King George VI and Queen Elizabeth to the centenary celebrations of the College (May 1946). During recent years the College has been helped to a very considerable extent by industrial concerns, as well as by the Ministry of Agriculture.

Present-day stature

Landmarks since 1945 have been the opening of Trent Lodge in 1947, through the generosity of Boots Pure Drug Co. Ltd. and, with the aid of the

Ministry of Agriculture, the acquisition of Coates Manor, now known as Bledisloe Lodge, in 1950. The former houses 37 students and the latter 64. At the present time a magnificent hall is being built; this is due to the generosity of the British Oil and Cake Mills Ltd., who are paying 50 per cent of the cost. Other important development work is proceeding and many other members of the feedingstuffs trade are assisting financially. The College, with the aid of the Ministry of Agriculture, also purchased Coates Manor Farm, and is now farming over 700 acres.

The College is run primarily for the training of farmers and land agents. At the present time 110 students each year start the Diploma Course in Agriculture, specializing in Agricultural Science, which covers the syllabus for the N.D.A.; 84 students take the Diploma Course in Agriculture, specializing in Farm and Estate Management, which covers the syllabus for the examinations of The Chartered Land Agents' Society and the Agricultural Division of the Royal Institution of Chartered Surveyors. In addition to these courses, both of two years, approximately 100 students take a One-Year Farming Course, designed primarily for older students who feel they have insufficient time to attend a Diploma Course. At the present time there are 464 students taking courses at the College, and there are long waiting lists for all courses.

The College in fact turns out about 300 students each year. Students come from all parts of the world, including at the present time 55 from overseas. Demand for places from the Commonwealth is at an ever-increasing rate. The staff when Professor Boutflour took over in 1931 consisted of 9 persons in all; it is now 25. The College is now entirely self-supporting financially.

Much of the present prosperity of the College is due to the support it receives from its old students. A large proportion of new entrants come on the recommendation of such old students. The scope of a short article will not permit mentioning many names of prominent old students, but those who have been awarded the Bledisloe Medal for distinguished services to agriculture are: the late Lt.-Col. Sir Archibald Weigall, Bt., K.C.M.G., D.L., J.P.; the late Alexander Goddard, C.B.E.; Sir John H. Milne Home, D.L., J.P.; and J. A. Arnold-Forster, O.B.E., F.R.I.C.S.

Professor Robert Boutflour, C.B.E.

An Appreciation

GUY CHIPPERFIELD, C.B.E.

THE retirement of Bobby Boutflour as Principal of the Royal Agricultural College, on February 28, removes from the active scene one of the most

capable, colourful, eloquent and forceful characters that ever adorned the fields of agricultural education and practice. Born in Durham, the son of a farmer, he graduated B.Sc.(Agr.) at Durham University at the age of twenty. Following earlier appointments at Tamworth Farm School and the Harris Institute, Preston, he joined the staff of the Yorkshire Council for Agricultural Education. Here, during the 1914–18 war, he did much work in connection with the ploughing-out campaign in Lancashire and the West Riding —areas where few farmers had ever seen a plough. Appointments followed as Organizer of Agricultural Education to the Lindsey (Lincs) County Council, and then (1922) Director of Agriculture to the Wiltshire County Council.

It was in Wiltshire that he began his work with milk cows and soon discovered that by feeding cows on a balanced production ration, he could lift individual lactations by 100 gallons. Here, too, he launched his "no roots, no cotton cake" campaign, "steaming-up" (a term which he himself coined), feeding balanced rations according to yield, elimination of chaff and control of bulk. All this knowledge, he says, came from work on one cow—a roan Dairy Shorthorn, which he nearly killed in the process of his experiments!

In a vigorous crusade throughout the whole country, dairy farmers flocked to hear his ideas and to be lashed by his eloquence. But also they went away with lessons they were determined to practise. Here was an outstanding evangelist, one who was soon to stamp his ideas and personality on the nation's system of milk production. Controversy has been the salt of his life, and many have learned wisdom from it. For without controversy, how should progress be made?

In 1927 Boutflour went to Harper Adams as Director of Dairy Husbandry. The British Friesian Cattle Society presented the College with a small but choice herd, with which Boutflour soon demonstrated that he could practise as well as preach.

Then, in 1931, came his appointment as Principal of the "Royal", where he has spent a brilliant twenty-seven years. Student numbers rose from a few dozen to nearly 500. New hostels, new teaching buildings have been acquired and built, new farms have been added. His farming skill has been acknowledged by the almost unchallenged yields of the Steadings herd, and his many distinctions in County Farm Competitions. His herd was a frequent prize winner in the B.O.C.M. National Milk Yield Competition.

During the second world war he was Executive Officer to the Gloucester W.A.E.C. He was awarded the C.B.E. in 1954, and a year later he won the Baxter Prize in recognition of his work for education in dairy husbandry.

During his time at Cirencester the "Boutflour System" has become known throughout the world. His work has been largely responsible for developing the scientific feeding and management of dairy cows, and thousands of farmers today owe much of their success to his influence. He is a man who has developed his knowledge by experience, who is true to his beliefs and is rightly proud of the College—indeed the industry—he served. His tenacity and courage have been as much admired as his forthright manner and pungent repartee have been enjoyed. To a vast knowledge, he has brought a brilliant mind and tireless energy, but also much human kindness and understanding of his fellow men; in all his work he has had the great good fortune of the constant help and encouragement of his wife Mary.

Moorland Reclamation in North Somerset

GEORGE JARRETT

Drainage of the low-lying Kenn and Tickenham Moors was carried out by the Somerset River Board in 1953. Mr. Jarrett urges that continued field drainage and cultivation should no longer be delayed, despite acknowledged difficulties.

NEARLY five years have elapsed since I described in this JOURNAL* something of the drainage of the Kenn and Tickenham Moors. Have those who farm such moorlands yet taken full advantage of the improved drainage? These moorlands, covering over 2,000 acres, between Bristol and Clevedon, include quite a variety of soils, including areas of deep peat. Trying to assess the results of this drainage scheme, I recently drove over some of this area. It seems that far too little has yet been done to improve this potentially rich area. One wonders what would have happened had this scheme been situated in the eastern counties. It is almost certain that by now the East Anglian farmer would have ploughed the greater portion of these moors, carried out many internal drainage schemes and either succeeded in converting the area to intensive arable cropping or have obtained a tremendous increase in output from improved grassland. This main drainage scheme cannot work successfully until individual farmers carry out their own smaller, but equally important, field schemes. The water must be able to find its way to the ditches which divide these moorland fields and from them either into main rhines or direct to the new Kenn river. Combined land drainage and ploughing can do much to bring about the improvement of such land. Varying schools of thought exist on the subject of the correct water level, and even now this is often kept at too high a level. Possibly something like 18–30 inches could provide the right level, leaving properly maintained ditches to hold the water and maintain proper fences.

Single-furrow ploughing

The ploughing of these moorlands presents many problems; some directly concerned with traction, some with plough setting and some a combination of both. To cope with the thick mat of these moorland pastures, a single-furrow plough is advisable: it deals more effectively with mat and top growth, and also it can be set to plough 10–18 inches deep. Shallower multi-furrow ploughing allows greater weed growth in the new leys, for all that it looks a passable job.

This has been proved on one farm, where some 30 acres have been ploughed and reseeded—probably the largest acreage tackled by any of the moorland farmers on a grass rather than an arable basis. Some of this was ploughed by crawler and single-furrow plough at a minimum depth of about

* A New Somerset River. GEORGE JARRETT. *Agriculture*, **60**, 368–23.

a foot and some with a wheeled tractor and ordinary plough. On the land ploughed by the latter much more weed growth is noticeable.

On closer examination, this heavier weed growth after shallow ploughing is not altogether surprising. For untold years crops of weeds and rushes have grown and seeded themselves on these lands. Some seeds have found a suitable medium in which to grow, others have lain dormant awaiting suitable conditions. These have come when the land has been ploughed shallow —from 5 to 8 inches—and so provided the right kind of seedbed in which to germinate.

It has been no easy task to enter some of these fields and get a plough set to turn a decent looking furrow, especially when considerable variations have been found in the depth of the top soil. Sometimes the water-table has been so near the surface that the furrow wheel of the plough has sunk, thereby disturbing the plough setting. This has had to be overcome by making a special rim to increase the width of the furrow wheel. In some fields the depth of peat varies and some of the clay subsoil has been brought to the surface. In one such field it is interesting to see that in the subsequent ley the cows grazed this area tighter than the rest of the field where only the peat was ploughed. The clay subsoil was very rich in lime and this no doubt accounted for the cows taking a liking to the ley grown on it. Extra working was required to produce the desired seedbed, although this would have been obviated had the field been autumn ploughed and spring seeded.

Even with crawlers, some fields have been so soft that a second tractor has had to be kept in reserve to extricate the one at work; in one particular field, frequent bogging occurred not only when ploughing but during rolling and cultivations. Also the peat can be set on fire and, once lit, such fires can be very difficult to put out.

Reseeding by example

What really surprised me was the fact that the practical examples set by a few of the more progressive men with moorland had not been followed by their neighbours. In the early days it was quite understandable that only the more courageous would step forward and start the plough going, hardly knowing where or how their enterprise would end. But the few early pilot schemes have proved successful and one would think that such success would beget a desire on the part of neighbouring farmers to get started on reseeding schemes of their own. It is not necessary to embark on large-scale schemes involving heavy capital expenditure for drainage and reseeding; five or ten acres at a time could be improved and stocking built up to match.

The particular farmer who has reseeded thirty acres started about six years ago and continued as a result of the outstanding success of the first field. This was ploughed about July and sown direct to a timothy–meadow fescue ley (commercial strains only) with a little H.1 ryegrass as well. Full use of this newly-sown ley was made in the following spring, and its cost was recovered in milk during the first two months of its life. Since then it has gone on to grow heavy crops of grass for hay and grazing.

No nitrogen was applied to get these crops, except that included in two dressings of 1½ cwt per acre of a complete fertilizer. Lime is not required, but possibly potash would bring about some good results when used in con-

junction with the land's principal need of phosphates. Again, do we yet know sufficient about the question of phosphate fixation on these moorlands? Should we apply fairly heavy dressings of phosphate or frequent light dressings? And having regard to trace elements, would it be advisable to use low-grade rather than high-grade slag?

Time alone will reveal the answer to many of our questions and theories, and as the moor fields vary so much no one man can speak for another. For those who, whilst wishing to make some improvement are still afraid to break the surface of their moor fields, some scope may lie in the direction of sod seeding. The combine drilling of a suitable seeds mixture, together with some fertilizer and allowing the disc drill to cut well into the old sward, may well do the job. This method would, of course, be an inferior alternative to ploughing and reseeding, but it could provide the answer to the more doubtful fields on very deep peat.

Sufficient has already been done by several farmers to show what potentialities exist both as arable and grassland, so that there is no excuse for the grass-loving farmer to refrain from efforts to improve his moorland. The fields are drying out, the internal drainage systems await a real onslaught; and when the water-table has been lowered and the newly-dredged ditches provide stockproof fences, then further advances can be made towards ploughing and reseeding or ploughing, cropping and then reseeding.

There is no shortage of phosphates or potash to make good deficiencies; there is plenty of lime in the vicinity to correct acidity where this exists, although surprisingly enough the lime status is often higher than one would expect—due no doubt to the area receiving the waters coming down from surrounding limestone hills. Some interesting experiments can be carried out in connection with the best strains of the various grasses. The plant breeders, at least, are never satisfied with what they have and are continually striving to produce something better for the farmer. Thought should be given to including some Aberystwyth S.50 timothy in mixtures. This extremely prostrate pasture strain, although not so productive as other strains, may, however, be worthy of a higher place in peatland seeds mixtures. Its habit of producing long, non-flowering tillers running close to the ground may help solve the problem of these new leys lacking the firmness of the original ancient grazings.

Leys with patience

Another point which occurs to me regarding the improvement of such land is the wisdom of trying to get a ley immediately after ploughing. When one considers that some of this peaty moorland (some is better described as bogland) is turned over and sees the light of day for the first time for a century or more, it is expecting rather a lot to try and create a first-class ley right away. Such soil is full of rush and sedge roots, and often comes up smelling quite sour.

A mistake is sometimes made in short-circuiting the process of improvement by not taking a cheap pioneer crop first. The cost of such mixtures is comparatively low—something between 10*s.* and £1 an acre can usually secure a suitable pioneer mixture based on rape, turnips and some ryegrass. With suitable fertilizer treatment, this can carry a large head of stock to

manure and tread the old sward which has been ploughed under and is still very spongy. If this mixture does not produce a good crop and the heavy stocking does not materialize, then it is very unlikely that a really good ley mixture costing several pounds an acre would have taken.

After a pioneer crop has been allowed to do its work—let us assume for the purpose of this article that it is fairly well established—the original cultivations, manuring and subsequent stocking will gradually be preparing the soil for the production of a more favourable medium in which to establish the final long-term ley. The second ploughing should be very much easier than the first, and in some cases rotary cultivations or heavy discings may avoid ploughing.

Even where there is a distaste for ploughing, much remains to be done with rush spraying, mowing and surface cultivations. One North Somerset farmer considers that he has better grazing on the reseeded spoil banks of the new river than there is on many parts of the original moorland.

Credit is due to the few farmers who have set out to change the face of their fields in this area, whether in the form of arable cropping with corn and potatoes or improved grazing with new leys. They are men who have set an excellent example and should be emulated. No one can say exactly what should be done on another part of the moor since conditions vary tremendously, but they are showing what can be achieved with a little courage to tackle these problems. Mistakes have been and will be made, but this also applies to every branch of farming. The greatest mistake, however, will be failure to take advantage of the better drainage provided by the Somerset River Board to release the great potential fertility of these moorlands.

Country Landowners' Association Game Fair

Ringing the changes on the agricultural shows, the Country Landowners' Association are organizing a Game Fair at the Hall Farm, Stetchworth, near Newmarket, on Friday July 25th and Saturday July 26th. The main purpose of the Fair, which will be the first of its kind in this country, is to show the keen shooting man the new post-war techniques of game rearing and management, so that he can improve or work up a shoot with his neighbours without interfering in any way with his farming and forestry programmes. Demonstrations of modern methods of rearing and managing game birds will therefore be a prominent feature of the Game Fair. Birds, brooders, pens, feeding-stuffs and other equipment will be on show on a large rearing field, and commentaries will be given on the exhibits. There will be a continuous showing of films relating to game management, and an information service will be provided by the I.C.I. Game Research Department.

Among the attractions will be clay pigeon shooting competitions, a ·22 rifle range, archery and falconry displays, gundog tests, and a variety of trade stands. Refreshments will be available on the ground. The Ministry will be showing methods of keeping down farm pests—pigeons, rabbits and rats—with demonstrations of the new humane traps to replace the gin, the use of which becomes illegal after 31st July. The Game Fair will be open from 10 a.m. to 6 p.m. on both days. Admission will cost 2*s.* 6*d.*; car park 5*s.*

Tithe Barns of the South-West

J. D. U. Ward

The great majority of England's better tithe barns are in the south-west of this country, and perhaps three-quarters of them are within a radius of 75 miles from Bristol. The reasons for this grouping seem to be two. The monasteries or religious houses, having chosen at the outset the better soils and kindlier climates, waxed most prosperous and most powerful in the region indicated. And that region is rich in good building stone, so the barns built by masons already trained in a local tradition were likely to be noble and lasting.

The largest tithe barn ever built in England was probably that which stood at the far east of the favoured quarter, at Cholsey in mid-Berkshire, until it was demolished between 1810 and 1820. It was 303 feet long by 54 feet wide, with a roof rising to 51 feet.

In the western extremity of Berkshire is Great Coxwell, whose tithe barn, still standing in good condition, is now a National Trust property. This well-proportioned and simple barn is reputed to have been praised by William Morris (who lived at Kelmscott, only a few miles distant) "as the grandest building in Europe". The barn is of the thirteenth or early fourteenth century and was built by the monks of Beaulieu Abbey. It is not among England's ten or dozen largest: a length of 152 feet and a width of 40 feet put it in the larger-middle category. But the roof, supported by two rows of timber pillars, appears immense and must be very heavy, for it is of Stonesfield slats or stone tiles. The east and west doors are ancient but the south door is modern. On the east side is a porch containing a "tallat", wherein the monks are said to have slept at harvest—and doubtless a single guardian at other times. Various fictitious traditions have been attached to this barn; it has even been called King John's Stable but, ancient though it is, its building cannot have been started in King John's time.

Wiltshire

Wiltshire is unusually rich in good tithe barns. Pre-eminence should perhaps be given to that at Place Farm, Tisbury, once a grange of the abbey of Shaftesbury. This fifteenth-century barn measures 189 feet by 32 feet and ranks among England's greatest ten. To the best of my belief it has the second longest thatch roof in England, the first place going to a riding school otherwise of no comparable distinction. The frivolous may ask whether it constitutes a thatcher's dream or thatcher's nightmare.

The much smaller tithe barn at Cherhill (111 feet × 38 feet), recently in a sad state, is of unusual interest in its main timber structure, especially to those who spare a glance at heavy-weight medieval carpentry. The Cherhill barn is said to have been built about 1425. A few years ago a pencil drawing of it formed a Christmas card of the Society for the Protection of Ancient Buildings.

The National Trust village of Lacock has a substantial fourteenth-century

tithe barn with an odd skew-end and a filled-in doorway. At the opposite end stands the village's eighteenth-century lock-up. No great distance away is Bradford-on-Avon, whose splendid barn near the canal is dated by experts as *circa* 1350, more probably earlier than later. This barn measures 170 feet by barely 35—and many would rank it above the larger Tisbury barn. It is certainly among the finest barns in England. Within, there are no aisles or pillars to support the roof: notes which I made some years ago, mention superb collar-beam trusses cut out of 14-inch oak timbers, and wall-plates 7 inches by 22 inches! But in recent years parts of this barn have been wearing a temporary false roof of galvanized iron while prolonged major repairs or restoration measures are undertaken by the Ministry of Works. Most of the old stone tiles are likely to be retained. The weight of the roof is put at 612 tons, a figure which may be of incidental interest to those who own stone-roofed buildings of comparable character but probably smaller size.

Gloucestershire

Gloucestershire is another county rich in grand barns. First, perhaps, should be the barn at Frocester. Built by John de Gamage, Abbot of Gloucester, between 1284 and 1306 (and thus among the oldest still in use—yet also in excellent general condition), Frocester barn is 184 feet long by 30 feet wide.

The much smaller barn (127 feet × 30) at Ashleworth, nearer Gloucester but on the western bank of the Severn, was in the news two years ago as being "threatened". It was in need of substantial repairs for which a sum of about £3,000 was required but it was ultimately "saved". This barn forms, with the church and the Court House, a particularly pleasing medieval group. Hartpury barn, not many miles distant, extends to 161 feet by 36, but its appearance is partly spoilt by the modern (presumably Victorian) roof. There is a record of this barn having been leased in 1539 to John Forthey, who paid a yearly rent in kind (most appropriately for a tithe barn) to the cellaries at the monastery in Gloucester: 36 quarters of wheat, 3 quarters of barley, 30 geese, 20 chicken, 40 pullets, 20 capons and 300 pigeons.

Somerset

Mention of pigeons, whose maintenance in manors and monasteries was for so many centuries a just grievance of farmers, may take us down to Somerset. At South Stoke, near Bath, there is an impressive smaller tithe barn with a gable-end devoted (apparently in post-monastic times) entirely to pigeon holes. This splendid barn was for long rather meanly roofed, and its condition (sagging walls and the like) was gradually worsening until the present owner took vigorous action on the lines of judiciously conservative restoration. In two places large and tricky wall-straightening operations were undertaken with great skill (and perhaps some luck); certain of the roof timbers were replaced—with Somerset oak; and split stone "tiles" were expertly laid in the traditional gradations. The result might now be described as a model of what can be done, where will and means together permit.

Englishcombe, a few miles away from South Stoke, retains an interesting example of a quite small tithe barn, but Somerset also has grand barns

worthy to be compared with any in the land. The barn at Doulting, with four porches, is impressive in its solidity. Dates are estimated at between 1380 and 1440. The barn belonged to Glastonbury Abbey, and the quarries at Doulting supplied much stone for building both at Glastonbury and for Wells Cathedral. Its beams rest on masonry pillars and when I was last there it was housing a grass-drier and other modern farm machinery.

At Wells itself, not far from the Cathedral, is the Bishop's Barn, and Glastonbury has a handsome and unusually well decorated smaller tithe barn. Here the symbols of the Evangelists are carved in stone on the barn. This feature may also be remarked at Pilton, where the tithe barn is larger—and roofed with thatch. But a lower edging around the eaves of stone tiles strongly suggests that originally the whole roof was of stone. A calf pen, built with straw-bales and lightly-thatched roof, against half of one wall, testified to the barn's continued farm use. Preston Plucknett, just off a main road west of Yeovil, is another example of an unusually fine Somerset tithe barn. West Camel has a smaller rectorial tithe barn, and Taunton retains a large but little appreciated part of another finer, smaller barn on the southern side of the county cricket ground. It no longer has any farm use.

Dorset

Dorset's most famous tithe barn is the impressive fifteenth-century building between Abbotsbury and the swannery. Originally 282 feet long, and thus quite exceptional, it is now roofless and ruined for half its length. The barn at Cerne Abbas, long ago fenestrated and converted to domestic dwelling, must also be mentioned, though it stands in private grounds and is not a show piece for every curious wayfarer. Wyke Farm, west of Sherborne, has a barn 268 feet long, but without being unduly captious, an observer may object that the length is made up in such a way, by accretions which are not under one continuous level roof, that it can only doubtfully be allowed the claim of being England's longest straight barn. However, the buttresses along a great part of the barn have the genuine air. A good view of it may be obtained from the main railway line.

Dry stone masterpiece

The subject of tithe barns is large and this article must, of necessity, omit far more than it includes, yet three or four other barns in the south-west of England must at least be listed. That at Middle Littleton, Worcestershire, 142 feet long by 38 and built (without mortar) in or about 1315, is outstanding as an example of the art of dry stone walling: it has been acclaimed by one enthusiast as "one of the marvels of the world". In the same county, Bredon has a handsome tithe barn, distinguished by the possession of an outside stone stairway and a beautiful medieval chimney shaft leading from a fireplace in the room over the south porch. This medieval chimney is probably unique, so far as tithe barns go.

Church Enstone barn in N. Oxfordshire has a well-preserved date-stone, giving in Latin the name of the builder and the year 1382. Books mention comparable date-stones in medieval Latin on barns at Calcot, Glos (A.D. 1300, in the cart porch; but possibly a removal from elsewhere) and at

Newington Bagpath in the same county. I have seen neither of the last two. Just possibly others exist: it would be interesting to hear of any earlier than 1540.

Finally, I should make an apology for an amateur's notes. Most measurements have been given at secondhand; some belong to the interior; others to the exterior. It is time that England's fine medieval barns and their history were surveyed, measured and listed comprehensively and systematically by persons having appropriate antiquarian, archaeological and architectural knowledge—in short, by trained scholars, rather than haphazardly by more casual admirers. For the moment it is desirable that the qualities of the barns should be recognized and preserved as well as they can.

West Country Cheese-making

J. D. GRIFFITHS, N.D.D., DIP.AGRIC.(WALES)
Principal, Gloucestershire Farm Institute

Farmhouse Cheddar and Caerphilly, products of the West of England, are being made under the M.M.B. Scheme.

FROM time immemorial cheese has been recognized as a very convenient way of storing the nutrients of milk, without deterioration, over long periods. Nothing is known for certain about its origin. It may be that since early man first carried his liquid foods and drink in containers manufactured from the skins and intestines of animals, milk put into those containers came into contact with the residual rennin of the animal's stomach and coagulated. Or it may be that surplus milk just went sour and coagulated. But however it came about, the resulting junket proved to be tasty and the process of coagulating milk thereafter became deliberate. The difference betwen this junket and ripened cheese is in some measure a matter of time, so it is not surprising that the early junket-makers very quickly discovered how to make cheese.

Milk in the raw state deteriorates very quickly. Butter without refrigeration will keep for only a few weeks. Cheese, on the other hand, remains wholesome for many months, and sometimes up to a year or more, depending on the variety. Consequently it is not surprising that many thousands of farms in Britain, up to the turn of the century, were engaged in farmhouse cheesemaking. Milk for liquid consumption was produced on farms near railways and the towns; butter was made on farms a little less conveniently placed, and cheese on the more remote farms where milk could be produced cheaply and plentifully but could not be brought to town quickly.

Farmhouse to factory

The main cheese-making districts were the grassland areas of the west—

Lancashire, Cheshire, Wales, and the south-west. This was because cheese had to be produced cheaply, and grass, of course, is the cheapest source of milk production. By the turn of the century, however, the New World was sending us ever-increasing quantities of cheese. New Zealand, Canada, and Australia had also joined our supply lines, and they provided us with cheese of very good quality at very moderate prices. In addition to this development, much had been learned about milk preservation by cooling, and our road transport had made great progress. We had moved from the horse to the lorry, which could travel quickly through the countryside, picking up milk over a very wide area. It followed, therefore, that farmhouse cheese-makers were happy to relinquish the regular task of making cheese and sell the milk in its raw state, particularly as the cash returns were on the whole more favourable for raw milk than for the manufactured product. Thus what had for centuries been a domestic industry now became a factory concern. This trend continued, and even accelerated, after the first world war. Today, comparatively little cheese is made on British farms. Roughly 70 per cent of our cheese now comes from overseas, and of the remainder, only about one-twentieth is made in British farmhouses.

Milk Marketing Board scheme

In spite of the movement of cheese-making from the farm to the factory, many dairy institutions (the Somerset Farm Institute at Cannington, for example) continue to provide excellent courses of instruction in butter- and cheese-making. In 1954, the Milk Marketing Board foresaw the possibility of our milk market returning to a position in which it would have a surplus, and so decided to set up a Farmhouse Cheese-makers Scheme to encourage those people who knew the art of cheese-making to return to it. The Board felt that such a scheme would provide a very special article of top quality and a working reserve of milk, which could come on to the market as cheese but in times of shortage could be recalled as liquid milk. The incentives offered to producers were a guaranteed price for the milk used, payments for its manufacture, a bonus on quality of the finished article, and the marketing of the cheese.

The south-west of England figures prominently in this scheme. Eighty of the 130 registered producers are in Somerset, and there are sixteen more in Wiltshire and Devon together. Gloucestershire contributes no members, but there are still a few remaining expert farmhouse cheese-makers in the county.

I recently visited Somerset and learned something about these farms. The work is exceedingly interesting, and their products are of a very high standard indeed. On one farm two varieties of cheese are manufactured, and this I believe is quite common practice. In early spring and late autumn the mild, white-fleshed, quick-ripening Caerphilly cheese is being made. During May, June and July the famous Cheddar is manufactured, and both seem to be finding a very ready market.

If import restrictions against cheese were removed from the Canadian and American markets, there would almost certainly be a demand from those countries for our best farmhouse Caerphilly cheeses. Similarly, given a free field in Europe, there is almost certainly room there for much of our best

Cheddar. About two-thirds of the cheese produced within the scheme at the present time is Cheddar: the rest is Caerphilly.

An art and a science

Present-day farmhouse cheese production, apart from being a great art, is a highly scientific process. Makers are very careful indeed about the handling of milk and the sources from which it is drawn. Whenever possible, the cheese-maker tries to secure all the milk he requires from his own farm or farms, his object being to get a supply from a known source of management, and thus to work with a known milk. Mixed milks are the cheese-maker's nightmare.

The process is so highly technical that it must be carried out by properly trained expert cheese-makers. These people command good salaries, and therefore the turnover must be fairly large to make it economical. There are very few small producers in the field today. But large or small, they put a tremendous amount into the job. On one farm, between 1,200 and 1,400 gallons of milk went into cheese-making each day. I watched the cheese-makers carefully measuring the acidity of the milk, cautiously raising its temperature to the desired degree, then adding and mixing the rennet with the same kind of care that an artist uses to mix colours. Then came the gentle agitation of the surface of the milk to keep the fat below until coagulation had taken place. After the curd had been cut to the right size, I watched the pearly cubes being stirred in the whey to prevent the escape of fat. The whole operation was one of considerable dexterity. It was a great source of joy to me to walk amongst the finished cheeses on the snow-white shelves in the cheese room, for it helped me to realize that something which once upon a time was so typical of the English countryside still remains with us, if only in a small way.

★ NEXT MONTH ★

Some articles of outstanding interest

BLENHEIM ESTATE *by J. R. Lee*

THE WASHING OF MAINCROP CARROTS *by W. Hugh Smith*

CHEAPER WINTERING FOR BEEF CATTLE *by A. J. Brookes*

ECONOMIC POSSIBILITIES OF SMALL DAIRY FARMS *by E. A. Attwood*

Rosewarne

F. W. SHEPHERD, N.D.H.(HONS.)
Station Director

Here leaps ashore the full Sou'west
All heavy-winged with brine.

KIPLING wrote these words of the South Downs. I little thought when I first read them in the "blue goodness of the Weald" that I should later be striving to create conditions in which to grow flowers and vegetables in similar circumstances to those of which the poet has also said "No tender-hearted gardens crown, No bosomed woods adorn". But the hundred-odd acres of Rosewarne rest on just such a brow of land as some of the whale-backed Downs. No more than 260 feet above sea level at any point, the experimental station is only two miles from the Atlantic on the north-west, and the scraggy quickthorn, oaks and blackthorn stream away almost horizontally to the east as they grow on the Cornish stone-faced earth hedges which form the boundaries of the fields.

The soil, however, is a deep, easily worked, light loam overlying broken shale which gives good drainage, except when really bad puddling sets the surface and holds up the water. The rain falls fairly uniformly throughout the year at an average annual rate of about 40 inches. Despite this quite heavy rainfall, the sunshine figures are high; in 1955, for example, we had 1,971 hours when the highest figures in the sunniest districts elsewhere in the country only just topped 2,000.

Frost is less frequent than in most other mainland districts, except the sheltered Mount's Bay coastal strip, some fifteen miles further west, and similar small areas elsewhere. The first air frost recorded each winter since records started at the end of 1952 has been after mid-December, and the first ground frost has occurred in late October each year. Two comparatively severe periods of frost have been recorded—in January-February 1954, and in February 1956; a minimum air temperature of 15°F was the lowest registered. Wind is the most noticeable feature of the climate of the station, and records of speeds and directions are being accumulated not only with the standard cup counter anemometer but with the aid of a wind run integrator provided by the National Institute of Agricultural Engineering.

Growth of the station

Most of the land was under permanent or temporary pasture when the Ministry took possession at the end of 1951. Much of it had been ploughed and reseeded during and after the war, and a small part of the southern slope was still under the remains of market-garden crops such as broccoli, spring cabbage and anemones which had been harvested the previous spring.

No building encumbered the ground, and this has allowed us to erect a

number of special-purpose buildings and eight dwelling-houses designed by the Ministry's architect in the South-west Region. Other major developments have included the provision of a main drainage system, a three-phase electricity supply, an ample water-supply with sufficient pressure for irrigation purposes, interior and entrance roads and the planting of shelter-belts and hedges along straightened field boundaries.

To build up fertility to a proper market-garden level, store cattle have been bought each autumn and fattened on hay made on the place, on cauliflower leaves which are available in some quantity from October to April, and finally on the grass leys in the following summer. The Rosewarne pedigree herd of Large White pigs is also being established for the same purpose. The boars and dry sows run on the leys in the last year before ploughing for cropping; the sows farrow in arks run over similar leys. From weaning to bacon weight the pigs live in a specially-built piggery and, with the aid of plenty of straw, produce much-needed dung.

While the station has been growing around them, the small staff of horticulturists started an experimental programme, chiefly with crops already of importance in the area. The station is by no means the first in this part of the country, since experimental work has been carried on by the county councils for upwards of thirty years at Bere Alston in west Devon, Ellbridge and Gulval in east and west Cornwall and Holy Vale in the Isles of Scilly. Testing new crops and new varieties, investigating diseases and pests, searching for the best manurial practices and serving in many ways the horticultural industry in the south-west, these stations with their enthusiastic staffs and committees composed chiefly of local growers had left behind them a legacy of interest and goodwill which has undoubtedly served our new and larger station in good stead. Bere Alston was closed during the war, Holy Vale in 1946, and Gulval was sold to a firm of seedsmen in 1952. Ellbridge remains as a sub-station of Rosewarne to serve the special needs of the Tamar Valley.

The task when Rosewarne was being started was not only to create a station in which horticultural crops could be properly grown and a varied staff could work in reasonable conditions. It was also to restart the experimental work and extend it to include all important aspects of the production of local horticultural crops, so that growers and their workers might maintain and improve their standard of living by providing the British housewife with top-quality flowers, fruit and vegetables in sufficient quantity at moderate prices.

Shelter

An extended experiment, also conducted at other centres, has allowed a detailed comparison of the value of solid and various semi-permeable types of artificial shelter. At Rosewarne at least, the value of shelter of any type for early potatoes, anemones and tulips has been shown.[1]

To provide shelter for other crops, shelter-belts and shelter hedges are being established of the more satisfactory trees and shrubs already used in the district. The main shelter-belt is to be of *Pinus radiata*, while hedges of *Escallonia* "Crimson Spire", *E. ingramii*, *E. macrantha* and *E.* "Red Hedger" and *Ligustrum ovalifolium* are now becoming effective. A wide range of other hedge and shelter plants is being tested in these exposed conditions,

and preliminary information about their growth has been described.[2] With no shelter to the west, and but little in other directions, the conditions have presented both a challenge and an opportunity to provide shelter for the crops to be grown and to test various methods of providing shelter.

Anemones

Cornwall and south Devon are large producers of anemones, which reach the markets from September to April. Almost all are grown in the open, and in many seasons the crops maturing in the most important period between Christmas and Easter are checked, spoilt or completely lost as a result of adverse weather. The whole area can in fact be regarded as on the very edge of the climatic region in which the anemone can be grown as a winter crop. Problems are therefore plentiful, and both at Rosewarne and Ellbridge the crop is being studied under a range of manurial and cultural conditions. The value of potash balanced with phosphates in flower production and the reducing effect of nitrogen on production and quality is being shown.[3] Shelter is essential but glass protection has not so far proved satisfactory. Variations in strains and varieties available to commercial growers have been noticed in observation plots at Rosewarne. Such strains are not easily identified from year to year but there is promise of improvement, as outlined recently.[4]

Almost all of the corms used in this country for flower production are produced in the Netherlands, although a few growers have produced some in Cornwall. The Dutch corms are, however, cheap and produced under very satisfactory conditions, so that production in this country may never be an economic proposition. Nevertheless the importance of the corms to anemone flower growers is so great that a start has been made in studying the methods of selection, seed saving, and corm production, and flower crops from some of the corms grown at Rosewarne were harvested last season.

Winter cauliflower (broccoli)

When the station was first opened the quality of the strains of winter cauliflower available to growers in the south-west was causing grave concern, and a start was made to assess the situation and to develop new and improved strains. In the first year, seed of varieties expected to mature during the period November to February was obtained from the majority of seedsmen trading in the district, and around Easter 1952 the Director and the first Horticultural Officer to be appointed to the station personally sowed the seeds for this trial. At the same time seed saved from selected stocks at the Gulval Station was also sown. During that season and subsequently, a wide range of English and foreign stocks of this crop have been studied, their faults assessed and the best types for the area identified.

This information was made available to local growers and to seedsmen who were able to visit the trials and compare the many stocks growing side by side under similar conditions, and an account of the work has recently been published.[5]

From the second season and since the preliminary study of the whole range of winter cauliflower varieties has ended, detailed variety trials of the most

promising varieties in the six winter groups have been conducted in co-operation with the National Institute of Agricultural Botany. These groups are classified as Extra Early, Numbers 1, 2, 3, 4 and 5 groups, and seedsmen's stocks of established varieties used in the district are continually being compared with new strains or varieties produced at Seale-Hayne Agricultural College and elsewhere.

With the guidance of the geneticists from the National Vegetable Research Station at Wellesbourne, a breeding programme has been started using the stocks of seed taken over from Gulval and others from the old Cambridge Horticultural Research Station.

Manurial and cultural experiments with this locally important crop have also been started. The crop is grown each year in the long-term experiments studying bulky organic manures, depth and type of cultivation used in preparing the land, irrigation and fertilizers of various kinds. The value of the additions of bulky manures for this crop is being demonstrated, and the effect of nitrogen in encouraging leaf edge scorch is noticeable.[6]

Seed rates, plant spacing, time of sowing and planting are all being studied and in general are demonstrating the long-recognized but oft-forgotten value of adequate spacing, in both the seedbed and the final quarters. The value of early planting to give ample time for growth to maximum productivity is abundantly clear.

Bulbs

Outdoor narcissus are produced in large quantities in the Isles of Scilly, Cornwall and Devon during the period November to May each year. Other bulb crops are also grown but in much smaller quantities, and all these crops had been the subject of investigations at the experimental plots run by the county councils in these areas. The variety collections maintained by Gulval have formed the basis for the present large collections at Rosewarne, where new and established varieties are being compared.

The collections provide detailed information about relative flowering dates, growth and flower qualities which are of great interest to growers and advisers in the area. As with other crops of importance, bulbs have been included in the chief experiments studying manures, fertilizers, cultivation methods, irrigation and shelter. They are, however, slow to respond, and it is only now after four or five years' work that the value of potash is beginning to be shown as of first importance, while phosphate has so far shown smaller responses and nitrogen even less. In particular, five seasons' study of daffodils on plots manured with a whole range of organic and inorganic nitrogen has shown no difference in the growth of the crop.

The stage at which bulbs are immersed in hot water for the control of pests and the time at which they are planted is, however, of great importance. Studies of the correct stage of development have been extended,[7] in order to shorten the time when it will be commercially possible to examine the bulbs and treat them without subsequent flower damage. In the absence of completely controlled storage conditions, early planting of bulbs is essential, and a very considerable reduction in the yield of flowers one and a half and two and a half years after planting has been clearly demonstrated.

The spread of the tulip strain of the stem and bulb eelworm has caused

concern to tulip growers, and the presence of a large number of varieties of this crop at Rosewarne enabled a study to be made of the effects of a range of hot water treatments on many of these varieties. It has been shown that, lifted early in the season and treated before the first flower initials have developed, small lots of tulip bulbs of most varieties can be treated for two hours at 110°F without damage to the subsequent flower crop or growth of the next year's bulb crop.[8]

Early potatoes

Although not in one of the very early districts, good crops of early potatoes can be lifted at Rosewarne early in June and sometimes in May each year. Again, this crop is being grown in the main long-term experiments, and separate investigations are also in progress. Testing new varieties, both in co-operation with the National Institute of Agricultural Botany and those produced by official plant breeders in this country and in Scotland, is an important task. In particular, the testing of potentially early varieties in this comparatively early district at the same time as they are tested elsewhere may disclose information about a new variety which might be lost, and at the same time may save a variety suitable for very early use from being discarded, as it might be if only tested in a maincrop district.

Each year, when lifted early at 10–12 weeks after planting, the standard Arran Pilot has been surpassed by a few other varieties, with this standard variety giving 4–5 tons per acre, then Craig's Alliance, Ulster Premier and Foremost have in one or more seasons given 5–6 tons. In most seasons, however, Arran Pilot has passed the others, producing 7–10 tons two or three weeks later when the earlier ones were rather less.[9] It appears therefore that for very early districts and for really early lifting some of the newer varieties have a value, but that if the farming method allows of either early or slightly late lifting according to season and market, then Arran Pilot is still the most satisfactory variety available.

Rosewarne is a useful centre for testing the new blight-resistant varieties, and interesting trials have been conducted in recent seasons. Few varieties resisted the disease for the whole season, but several showed sufficient resistance to allow a longer growing season than that of the commercial varieties growing beside them. Some varieties with a degree of resistant foliage showed little or no resistance to the disease on their tubers.

Spring cabbage and other crops

Most varieties of spring cabbage available in this country have been grown at Rosewarne for several seasons and records have been made of their earliness, uniformity and other qualities. More recently detailed trials of the most satisfactory varieties for both early cutting as greens and later cutting when hearted have been arranged with the National Institute of Agricultural Botany.

Top-dressing the growing crop with nitrogen has an important part to play in producing maximum and early crops. This aspect of production is being tested and total dressings of up to 1 ton per acre nitrate of soda or its equivalent applied in January and February increased yield.[10]

On plots comparing various combinations of fertilizers and manures, farmyard manure at 10 tons per acre gave earlier crops in some seasons than other plots receiving fertilizers.

In addition to the five important groups of local crops already mentioned, anemones, bulbs, winter cauliflower, potatoes and spring cabbage, others are being examined. Collections of violet and chrysanthemum varieties and polyanthus strains are being examined. Mid-season and late chrysanthemums are being tried with other crops in three types of mobile glasshouses, while early varieties are extensively tested at Ellbridge each season.

For three years a trial of outdoor tomatoes has been undertaken for the National Institute of Agricultural Botany, and in the protected cropping section varieties of melons, sweet corn and lettuce have been tested in parallel with other stations. Early turnips, carrots and radish are being tested under Dutch lights and cloches in order to examine these cropping systems in this part of the country. A trial conducted at several centres has sought information about the best spacing and rates of nitrogen top dressing for self-blanching celery. Early strawberries are being tested in various ways under differing forms of protection at both Ellbridge and Rosewarne, while Rosewarne is one of the centres for the National Fruit Trials strawberry variety trial.

A small collection of old local and new nationally-known varieties of apples is being established, and it is already interesting to see the damage caused by strong winds to some of the modern varieties, while the local varieties grow strongly without very much harm.

The National Fruit Trials have sent us standard collections of raspberries, black and red currants and gooseberries, while some new and possibly earlier varieties of gooseberries are being established for trial at Ellbridge.

In the six years of its existence the land and surroundings at Rosewarne have started to change from agricultural to horticultural. And, within the limits of the staff, space and equipment, the most important crops for the south-west of England are being examined from many angles. Other crops of less importance and those of, at present, only potential value are being tested under our rather special climatic conditions.

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Farming Cameo: Series 2

4. Newport Pagnell Area, Bucks

E. H. BRANT
District Advisory Officer

ALTHOUGH much of the Newport Pagnell district consists of heavy land, it is one of the most productive agricultural areas in Buckinghamshire. It is at the extreme north of the county, where it adjoins Northamptonshire and Bedfordshire—in fact Newport Pagnell is nearer to Northampton and Bedford than to the county town of Aylesbury, and before motoring became common mid and south Bucks seemed remote and inaccessible. Nowadays, however, with adequate facilities for travelling, farmers can transact business over a wide area, both in the county and out of it.

Newport Pagnell district, which has an agricultural area of 76,000 acres, is shaped like a crudely-drawn semi-circle with its diameter along the eastern boundary which separates it from Bedfordshire. It extends from the outskirts of Leighton Buzzard in the south to Lavendon, a village on the east of Olney (where William Cowper, the famous poet and hymn-writer lived, and where today the Olney Pancake Race is run) in the north, a distance of twenty-two miles. On the extreme west of the district lies Wolverton, where British Railways have an important carriage works, and between there and Leighton Buzzard, on the main railway line from Euston to the north, is Bletchley with its big brickworks (on the Oxford Clay) and its developing light industries. As might be expected, for years agriculture has had to compete with other industries for workers, so that farms have always been short of labour.

For the most part the district is on boulder clay, but there is a substantial outcrop of Oxford Clay, stretching in a north-easterly direction from Bletchley to the Bedfordshire border. In contrast there are small areas of gravel and lighter land in the Ouse valley, and gravel is now worked from several "wet" pits. The district is crossed by the Ouse and its tributary, the Ouzel; on a map their valleys look like an inverted "Y", the confluence being at Newport Pagnell. These rivers flow sleepily along a meandering course, and flood the adjoining meadows several times a year, whenever there have been prolonged periods of heavy rain. On either side of the Ouse valley there is a narrow strip of Great Oolite Clay and Limestone about a mile wide, and a small patch of Cornbrash extending eastwards from the northern part of Olney to the county boundary. Most of these soils tend to be waterlogged in wet seasons unless artificially drained; in fact drainage is the most important factor limiting crop production. In the 1920s and 30s it was sadly neglected. The principal watercourses were seriously impeded by vegetation, and silted up; farm ditches were trodden in level full; and under-drains had become blocked. As a result many of the river meadows had deteriorated, the grassland had become hassocky, and much of the arable land had gone out of cultivation because it was waterlogged. During the 1939–45 war an outstanding transformation began and has continued since. The River Great Ouse Catchment Board vigorously tackled the big task of dredging the prin-

cipal watercourses to make them function effectively. Labour and machinery supplied by the War Agricultural Executive Committee dug out miles of subsidiary watercourses and farm ditches, and a substantial amount of ditching is still being carried out, on contract, by excavators belonging to the Ministry of Agriculture. In addition, careful attention has been paid to under-drainage. Many fields have been drained (mole-cum-tile—that is to say, a skeleton system of a tiled main with tiled laterals over which mole drains are pulled), but there are still more to do. An appreciable area is now satisfactorily drained, and if given well-chosen and timely cultivations and adequate manuring, it is capable of growing good crops, especially of corn and leys. All money spent on drainage work has proved to be an outstandingly profitable investment.

Before 1939, much of the district was under grass, mostly set up in ridge-and-furrow. During the war an extensive acreage of grassland was ploughed up, so that at the peak of the ploughing-up campaign nearly 60 per cent of the agricultural land carried arable crops. According to recent agricultural returns, approximately one-third of the land is in permanent grass, one-third in leys, and the remaining third under tillage crops. About three-quarters of the tillage acreage is planted with cereal crops which, when sown on satisfactorily drained land, produce good yields. Wheat is the favourite corn crop, but nearly as much barley is drilled. A substantial acreage of oats is grown for feeding to stock. Half the remaining tillage is in bare fallow, and the rest in root crops of various kinds. Very little sugar beet is grown in Bucks, but practically the whole acreage (less than 500 acres) is in the Newport Pagnell district on some of the easier working land in the Ouse valley. Shortage of casual labour is a serious problem which deters farmers with suitable land from growing more root crops, especially potatoes. To lift a potato crop on heavyish land in a wet autumn with insufficient labour, is an unprofitable, worrying, and heartbreaking experience. The soils of the district seem to suit the clovers. Long leys take well, and remain fully productive for a number of years if managed with skill and care. Both S.100 and S.184 white clover are grown for seed on a number of farms in the northern part of the district, and satisfactory yields of good quality seed are obtained.

In the south of the district the farms tend to be smaller, and the principal enterprise is milk production. Before 1939 the Dairy Shorthorn was to be found on most farms, but now there are numerous herds of Friesians and Ayrshires as well. Except on a small acreage in the valley of the Ouzel, the grass is not good enough to fatten bullocks. The fertile valley of the Ouse extends from Wolverton through Newport Pagnell to Olney and beyond. In this region the farms are larger, and milk production plays a less dominant part in farm policy. Many of the meadows will fatten bullocks, and the so-called "uplands", the gently rising sides of the valley, are suitable for both arable cropping and grass. At one time strong stores, Hereford crosses, were bought at Northampton and similar big markets, and fattened on grass. Nowadays home-rearing of stores for fattening later is more widely practised. In addition to feeding bullocks, many of the farms carry a dairy herd of big-framed cows which are usually mated to a beef bull. Grass sheep are to be found on most farms throughout the district, except on the comparatively few small and medium-sized holdings specializing in milk production. There is no dominant breed: the ewes, which are of mixed origin, are crossed with a ram of a Down breed, or with a Western, and the resulting lambs are fattened on grass.

Compared with much of South Buckinghamshire, the Newport Pagnell district is still rural in appearance, even though industrial development is progressing rapidly around Bletchley, Wolverton, and other places. The standard of farming has steadily improved since the depression of the 1920s and 30s, and is now very creditable, technical progress having been sound and sure rather than spectacular.

Farming Affairs

Honey harvest

It takes more than just a keeper of bees to market honey in a way that competes with the host of attractively packed sweetmeats displayed nowadays in grocers' shops and self-service stores.

For the beekeeper who produces a hundredweight or more of honey in excess of his own domestic needs, but fights shy of marketing his product himself, the wholesale buyer offers a useful outlet. Final presentation to the public then becomes the responsibility of a specialist in this aspect of marketing, who will sell the honey under his own label. The beekeeper will of course be paid less per pound than for honey packed for retail sale in jars, but he will save the labour and expense of bottling and labelling.

Nevertheless, there is often a ready retail sale for a good local product bearing the actual producer's name on the label. To gain and keep this market, the pack must be of a uniformly high standard, regularly repeatable throughout the year. Distinctive and attractive labels on the jars—perhaps of different colours or designs for clear and for crystallized honey, with coloured caps to match—are important aids for attracting custom and gaining repeat orders. But sales will be few, and repeat orders fewer still, unless the contents of the jars are equally attractive, both to the eye and to the palate. Clear honey should be really clear and sparkling, and should remain so while on display in the shop. Crystallized honey should have a fine, even grain and be soft enough to spread easily on bread and butter.

The honey should be strained and allowed to settle, and then stored in 14 or 28 lb cans for bottling as required, with the aid of a warming chamber. When clear honey is required, a can is placed in the chamber and left there until its contents are completely liquefied, ready for bottling from the usual type of tank with a valve at the bottom. For soft, crystallized honey, the contents of the can are warmed until they are soft enough to be stirred into a smooth mass for bottling from a tank while still warm.

Further details of this method of preparing clear or soft crystallized honey, with information on many other aspects of extracting and bottling honey, are to be found in *Honey from Hive to Market*.*

Poorly packed honey, carelessly labelled, is a bad advertisement for the producer and reacts unfavourably on the market generally. See to it, therefore, if you harvest enough to have a marketable surplus, that your honey is a credit to yourself and to the bees that made it.

P. S. MILNE

Beneficial insects

The fifth edition of the Ministry of Agriculture's Bulletin No. 20,† published in May of this year, is a study of insects and other small organisms

* Ministry of Agriculture *Bull. No. 134*. H.M. Stationery Office. 3*s*. (3*s*. 2*d*. by post).

† Beneficial Insects. B. D. MORETON. Ministry of Agriculture *Bull. No. 20*. 5th Edition (1958). H.M. Stationery Office. 5*s*. 6*d*. (5*s*. 10*d*. by post).

which are of direct or indirect benefit to man, with particular emphasis on those which prey upon crop pests. It was first published in 1922, and the present edition, the first to be issued since the war, has been entirely rewritten by Mr. B. D. Moreton, Senior Advisory Entomologist at the Wye Sub-centre of the N.A.A.S. It is illustrated by 32 water-colour drawings, many of them entirely new ones prepared by the author and Mr. H. B. Foster.

Insects of direct value as sources of food, dye-stuffs, fishing bait, and so on are briefly referred to, as well as those on which we depend for pollination of fruit and seed crops. Predators or parasites of important crop pests are then described in detail. They include the familiar ladybirds, many lesser-known insect predators, and the inconspicuous relatives of wasps and flies whose immature stages are parasitic in the bodies of caterpillars and other noxious insects. Reference is also made to predatory mites and the agents of natural disease in insects, especially viruses, which have been the subject of much recent research and which may offer new possibilities for pest control.

The bulletin concludes by considering the rapid development of modern insecticides and their effects on beneficial insects, the part played by biological methods of control, and the future outlook for the chemical and biological approaches. That the new and powerful materials at our disposal bring their special dangers is made clear by examples. The danger to bees and other pollinators is well known, but less obvious effects of insecticides on predators and parasites need careful attention. It is argued that there is a need for specific insecticides to kill the pest but not its enemies, and especially for foresight in planning spray programmes which will give the maximum benefit from both insecticides and natural enemies.

Bulletin No. 20 should be of particular interest to fruit-growers and to all with pest control problems. It should also appeal to the student and the general reader with an interest in agriculture or natural history.

J. F. SOUTHEY

Cider and perry orchards

Cider orchards in England and Wales cover 41,236 acres. Over the last six years the number of trees has dropped by 6 per cent. The perry acreage is now just under 3,000, and shows a much greater fall both in acreage (30 per cent) and in tree numbers (37 per cent).

Although the slow decline in cider acreage is bound to continue, as grubbing of the oldest orchards proceeds, the productivity per acre is steadily rising. Furthermore, the number of young trees now being propagated shows a sharp increase; some 30,000 trees are being raised per year.

The wholesale grubbing of perry pears has caused concern to the industry, more especially as the market for perry has increased. The situation has been aggravated by the lack of any replanting within the last fifty years. An extensive planting programme is now in progress, and the number of young trees already being propagated is again of the order of 30,000 per annum. This rate of increase in tree numbers may double the present figure in three years.

The production of both cider and perry fruit is now entering a new phase, as the farmer is becoming increasingly a fruit producer rather than a cider-maker. In the past farmers complained of low cider apple prices, and cider-makers have often been dissatisfied with the quality of the fruit available.

For this state of affairs the standard of the orchards has been responsible, for at the beginning of the century the reviving industry was left with a legacy of impoverished orchards containing heterogeneous varieties.

The changes since that time have been described in the Bath and West Society's report written in 1956,[1] where it was suggested that some firmer contract was called for between grower and cider-maker if the raw material of the industry was to be safeguarded in the future. Things have already moved further in this direction: for one reason, the cider-makers are now in a better position to state their own requirements. In the last few years the quality standards of cider have been raised and new types of cider and perry have appeared on the market. To produce these, the industry needs something better than the mixed fruit supplied in the past: adequate supplies of vintage cider varieties, particularly bitter-sweets, are essential.

In a normal year cull fruit can be had at low prices in sufficient quantities for blending, and there is little chance of higher prices being offered to the grower of mixed farm orchard fruit of the same type and quality. The cider-maker is only prepared to pay the higher price for reputable cider varieties of vintage quality.

Our cider orchards will thus only be put on a firm footing when the grower receives an adequate return and when the cider-maker is offered suitable varieties. The new list of Recommended Cider Varieties put out in 1957 by the Cider Advisory Committee at Long Ashton[2] after consultation with all the interested bodies was designed to be thoroughly realistic. Dual-purpose apples that may be graded as culls by the cider-makers have been eliminated, and the list is based on a selection of good quality cider varieties acceptable to the industry as a whole. It is essentially a grower's list, for it includes only heavy cropping varieties of good health and constitution.

The selection of perry pear varieties is equally important, and some guidance in the choice of varieties has already been given.[3] Many cider apple varieties and, even more particularly, perry pear varieties are infected with virus diseases that severely reduce cropping. The Research Station is making selections of healthy clones for both apples and pears to ensure that future plantings are only made with the best possible material.

A. POLLARD and R. R. WILLIAMS
Long Ashton Research Station

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Inn (Stevenson's "Spy-glass"), a few yards from the quay, still stands in King Street to prove it!

With the discovery of North America, the eyes of Bristol merchants were turned westward to the seemingly limitless opportunities which were suddenly revealed to them. But such trade was not to be gained without bloodshed, and many a Bristol man gave his life in the struggle to attain commercial supremacy in new markets. But by the middle of the seventeenth century the port was the centre of a triangular trade sending merchandise to Africa, from there shipping slaves to America, and returning to Bristol heavily laden with sugar and tobacco. So long as the trade routes of the world depended on sail, Bristol was in a particularly favourable position, and she made the most of it. But the Industrial Revolution and the coming of steamships set a period to her prosperity, diverting trade to the north, until in the late 1840s the Corporation took over the Avonmouth and Portishead docks from private companies, built a new dock seawards to accommodate the growing size of ocean-going ships and reduced extortionate dock charges.

Despite heavy war-time bombing, Bristol is still rich in the evidence of her early, formative days: in the narrow, sunless lanes and passages which thread the old town like dark strands in an old tapestry; in the tall, huddled houses that one time lined the quays; in the castle set at the end of the Avon-Frome promontory; in the dockside Cathedral and countless churches which add a special meaning to the city's motto *Virtute et industria*. Early Georgian, Regency and Victorian influences in the once stately homes of Bristol merchants are abundant in her squares and terraces, requiring no great imagination to re-clothe them with the elegance of an age when sparkling equestrian carriages drove from the fashionable developing Clifton down Blackboys Hill and Whiteladies across the city to the cathedralesque St. Mary Redcliffe, which the first Elizabeth described, not without good reason, as "the fairest, goodliest and most famous parish church" in her realm. It was in the muniment room here that Thomas Chatterton, the Bristol boy poet, claimed to have discovered the Rowley "medieval" manuscripts—a literary imposture which was destined to bring him dishonour and subsequently to suicide in a Holborn garret. A mean monument stands to him in unconsecrated ground in the churchyard.

It was for Bristol that the eloquent Edmund Burke was returned to Parliament until his uncompromising support for the repeal of the Corn Laws earned him the approbrium instead of the respect of Bristolians. From Bristol, Wesley and Whitefield launched the greatest religious revival since the Reformation, and it was here, too, that Hannah More and Mary Carpenter worked unremittingly to bring a sense of humanitarianism to minds long inured to want and suffering. The names of Bristol's famous sons and daughters is legion, and all have left some mark upon the character of this great city.

But Bristol rests on her past only to inspire her future. A new city is rising from the old. Proud of her present civic status as City and County, she is expanding and developing her modern industries with the same foresight and determination with which her early merchant princes set her upon the road of prosperity. For over seven centuries Bristol has derived and renewed her strength from the sea. She continues in that tradition.

Book Reviews

Origins of Ownership. D. R. DENMAN. Allen and Unwin. 22*s*. 6*d*.

The title of Dr. Denman's new book better describes its contents than does the sub-title "A brief history of land ownership and tenure from earliest times to the modern era", because the author's range does not, in fact, go beyond the fifteenth century.

Dr. Denman never panders to his readers. In this book there is a wealth of research and scholarship, but it is not easily reached. Students reading for the many professions concerned with land ownership and use must bring their cerebral pickaxes and dig for the gold. The need for this arises partly from Dr. Denman's well-known style of writing, and partly from the inadequacy of the index. Although there are excellent chapter bibliographies, and nearly 700 footnotes to the 180 pages, the work put into the body of the book is unnecessarily buried for lack of an index which distinguishes the page references. A student is not satisfied by being told merely the numbers of the 34 pages on which he can find the words "rent" and "vill". The book would also have been greatly enriched with a vocabulary or an index-guide to the meaning of manorial terms. For example, the reader encounters the word "merchet" on p. 117 and again on pp. 119, 120 and 121 but not until he reaches p. 122 is the nature of this particular manorial incident disclosed.

Enough of criticism. Although the student may cavil at the stiffness of his task, he will find it a rewarding one, and the general reader will chance on much that interests and enlightens him. Taking, for instance, four points at random, he will learn (on p. 38) that although Hadrian built roads at his own expense across Spain, Africa and Asia, when he came to build the Appian Way he extracted a charge of one-third of its construction cost from the owners of adjoining land; also (on p. 133) that in the reign of William I a scutage of two marks represented a knight's remuneration rate of 8*d*. per day for the full feudal obligation of forty days' military service; (on p. 146) that seven hundred years ago it was the practice of certain monks to pay the equivalent of ten years' purchase when buying freeholds; and (on p. 147) the distinction between a living gage or vifgage, and a dead gage or mortgage.

Dr. Denman has skilfully drawn together the themes of those other authors who have studied the origins of land ownership from various specialist aspects, some legal, some economic and some social. He places at our disposal, for a trifling sum, the fruit of much devoted study and we are truly grateful.

R.C.W.

Breeding Better Cows. CRAIG WHEATON-SMITH. Dairy Farmer Books. 16*s*.

Breeding Better Cows starts off very well with a brief survey of the evolution of cattle and the development of planned improvement in Britain. Then follows an excellent account of the origin and history of the British dairy breeds—the book is on dairy cattle, not cattle in general. This is clearly a subject on which the author is an expert, and he writes from historical fact, without the wishful thinking and propaganda so common in breed histories.

In the chapter on *Bringing breed societies up to date* the author rightly deplores "ridiculous trade-marks", breeding for a type "laid down originally in ancient Rome", and "meaningless awards" (type standards and awards of merit). He makes constructive suggestions for more progressive activity by breed societies, and urges that they should be more active in the field of progeny testing bulls—even that they should withdraw pedigree status from daughters of bulls proving poor.

The four chapters on genetics give a clear account of basic principles, but Mendelian ratios occupy too much space, while heritability and regression are mentioned without being sufficiently explained. Inbreeding is extolled too highly as a method of improvement; in fact it is

usually not an end in itself, but an unfortunate necessity when concentration of superior genes is desired. *Why breeding for type is wrong* includes variations on an earlier and commendable theme, but gets led away into breeding for gland efficiency, which raises more problems than it solves.

The final chapters include *A practical approach to breeding, Selecting breeding stock, Taking the gamble out of breeding,* and *Combining art with science.* These should be the key chapters of the book, giving the formula for breeding better cows. They contain a lot of sound common sense and squash some old superstitions, but I am afraid that they do not quite live up to their high-sounding titles. The glossary of genetic terms, and the supplementary chapters on undesirable characters, blood typing, and hormones are full of useful facts; but that on statistics is out of place.

When reading this book, one is impressed by the author's erudition and the wealth of his ideas. Breeders, and particularly breed societies, should find it very stimulating, but it is doubtful if it will, in the words of the publishers, "help to breed a better herd". The author is more modest in his claim, and admits it is "a rapid survey rather than a detailed examination of every aspect of dairy cattle breeding". Indeed it does appear to have been written too quickly. There are many vivid images and a lot of much needed iconoclasm, but it presents a philosophy, rather than a recipe, for breeding. We look forward to the more carefully composed textbook which will be, in fact, what this one claims to be.

I.L.M.

The Domestic Rabbit. J. C. SANDFORD. Crosby Lockwood. 20*s.*

The Domestic Rabbit is well printed and illustrated and covers every aspect of rabbit keeping. There are chapters on the rabbit fancy (covering the work of the British Rabbit Council in this connection), on the industry at home and abroad, and on diseases and ailments.

There are surprise items: for example, one might be amazed at the dressing out percentages (p. 176) for rabbits on a very high level of nutrition, since the figures given are only what one would expect from young rabbits without high level feeding. But the book is well prepared and quite suitable for students wishing to go up to the standard of the National Diploma of Rabbit Husbandry.

W.K.W.

World Wheat Statistics.

The International Wheat Council has recently published the 1958 edition of *World Wheat Statistics.* This volume, which contains the more important data on wheat, may be obtained from the Council, Haymarket House, Haymarket, London, S.W.1, price 20*s.*

Books Received

Finance for Farmers and Growers, 1958. Martins Bank. (Obtainable free from any branch of the Bank.)

Dartmoor. (Regional Books Series). E. W. Martin. Hale. 18*s.*

British Standard for Agricultural tractor details for light and medium powered tractors (B.S. 1495:1958). British Standards Institution. 5*s.*

John Innes Horticultural Institution 48th Annual Report, 1957. 3*s.*

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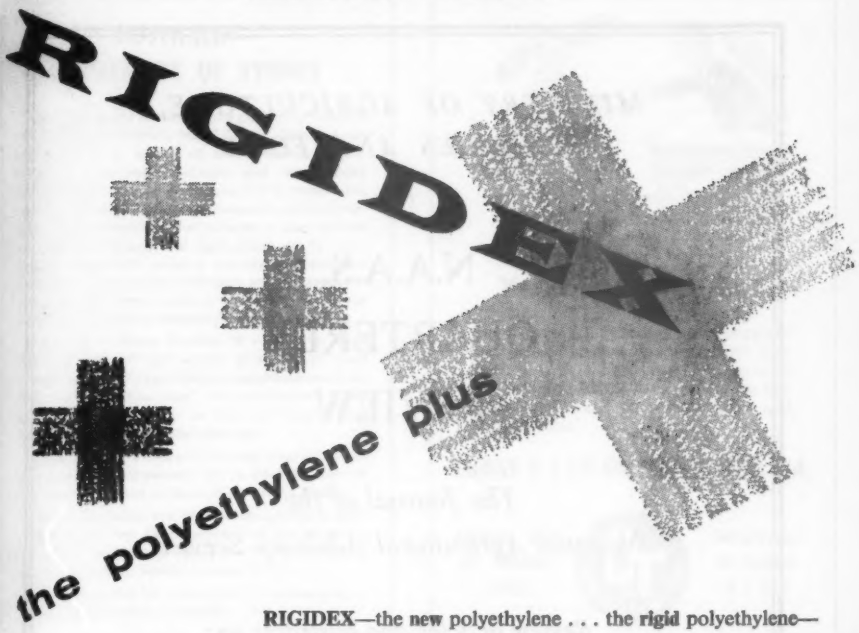

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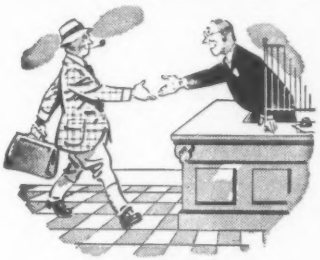

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